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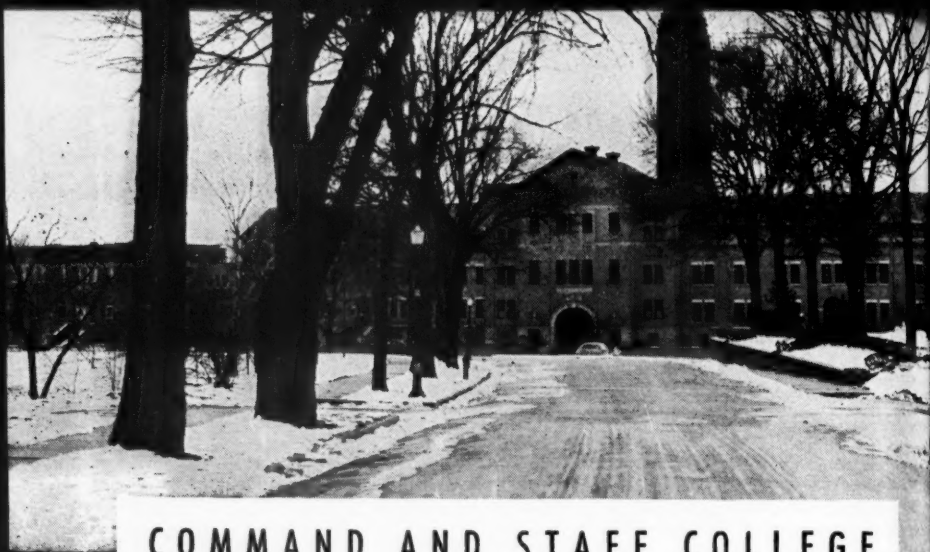
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The Methods and Functions *of* **Military Psychological Warfare**

Colonel H. D. Kehm, *Field Artillery*
Instructor, Command and Staff College

This is the first of three articles on the subject of Psychological Warfare by Colonel Kehm. The second and third articles will appear in early issues of the Military Review. During part of his tour with OPD, Colonel Kehm was the War Department representative of the Joint Chiefs of Staff liaison officers with the Overseas Branch of OWI. One of his missions on a trip to Europe, Africa, the Middle East and India in the winter of 1943-44 was to observe propaganda operations in these areas. Colonel Kehm was later Military Deputy to the Chief of Psychological Warfare Division of SHAEF and G-2 Ninth U.S. Navy.—The Editor.

The Background

IT is significant that in the dark days of their early meetings, President Roosevelt, Prime Minister Churchill and the Combined Chiefs of Staff recognized propaganda as one force they could employ against the Axis long before the military and industrial power of the Allied Nations could make itself felt.

Translating this recognition of the importance of the psychological factor in war into effective doctrines and procedures for conducting efficient psychological warfare to aid our armed forces in World War II was a long and tedious process. Descriptions of phases of this process are found in an outline of its operations

prepared by the Psychological Warfare Division of SHAEF. Corresponding sections in various other headquarters have also prepared comments and reports thereon in histories and in after action reports.

In addition to this wealth of material on psychological warfare in World War II, there is a surprising amount of published material on the conduct and results of psychological warfare in World War I. The following are particularly valuable:

Blankenhorn, H.—*Adventures in Propaganda* (1919).

Laswell, H. D.—*Propaganda Technique in the World War* (1927).

M.I.D.—*Propaganda in its Military and Legal Aspects*.

Bruntz, G. G.—*Allied Propaganda and the Collapse of the German Empire in 1918* (1938).

These citations are given to indicate that we are under no illusions that this is the first treatment of this complicated subject. The only "new" angle in this study is that it aims to mention some of them and to indicate a program which the United States Army might follow to prepare itself to meet quickly and efficiently the many intricacies which this subject will entail if our country should be involved in another war.

It has long been a military axiom that armies can be rendered powerless in other ways than by annihilation. Disease and

lack of vital supplies are some of the more common of these "other ways." A still different one—destruction of morale—has been illustrated many times from the days of Jericho to the catastrophe in France in 1940—perhaps one should cite what has been called the disintegration of our own Army.

Although there has been ready agreement on the fact that destroying the morale of an armed force is a sure way of destroying that force, there has been little agreement on doctrine and procedure to indicate ways in which a commander should go about destroying the morale of his enemy. Ghenghis Kahn, Attila and William II believed that "the terrible swift sword" applied with violence and ruthlessness was one way of reducing the overall amount of fighting. Hitler and Goebbels destroyed the morale of their neighbors by the application of terror tactics and the war of nerves. Coupling this with a cynical plan of deceit and falsehoods they enjoyed such a period of success that many men and some nations were convinced that victory was certain to fall to these malefactors. In the end, Germany and her allies reaped the fruit of the dragon's teeth which these men sowed with such abandon.

One other theory on the destruction of enemy morale rests on the premise that men can be persuaded to give up a fight if they can be convinced that they are engaged in a hopeless or futile war or are fighting for an ignoble cause.

Both of these are psychological warfare. The terror tactics program and the campaigns of deceit are more dramatic and have tended to remain in men's minds to exclude or at least to becloud the more upright methods of honest persuasion.

Psychological warfare like most other forms of combat is not new in our Army. George Washington employed persuasion to get many Hessians to leave the British ranks and some of them actually to join

the patriot forces. Leaflets were distributed by both the British and Americans at Bunker Hill. Leaflets and voice casts were used extensively and with success in World War I, as the G-2 Summaries of the AEF bring out in so many places. On the German side the memoirs of both Hindenburg and Ludendorff credit Allied leaflets with playing a major part in destroying the morale of their troops.

After the war there was a very widespread debunking campaign and an almost hysterical rash of articles and studies on propaganda. Any and all information services of foreign countries were and still are viewed with more than alarm. So great was this fear of propaganda that during World War II, OWI (Office of War Information) was regularly accused of propagandizing our own people and thus constantly forced to defend itself against that charge. This it could always do effectively, but the fact remains that the United States fear of "enemy propaganda" is *per se* an illustration of the fact that we as a nation know that psychological warfare is effective. This fear, coupled with the lack of doctrine, and a jurisdictional squabble in certain government agencies served to complicate our efforts and made it impossible to achieve the maximum efficiency.

The Concept of Psychological Warfare

It is important to keep in mind that one can work on the will and morale of the enemy—that is, conduct psychological warfare—in many ways. Actions, even more than words, depress the morale of an enemy. The bomber offensives against Japan and Germany were psychological war as well as shooting war. They were designed to affect the mind of the enemy as well as his body. The masterful tactics of Rommel, Montgomery and Patton were psychological war as well as shooting war. Such commanders, by skillful applications of fire and movement, planned with a

view of producing great mental as well as physical effect on the enemy, conduct psychological warfare even though they never drop a leaflet or use a single radio. But it is hard to conceive of a single military situation in which words might not help.

This is true because armies consist of men, and men can be defeated in all sorts of ways. Some men can be beaten most easily by shelling or bombing. Others can't stand up against the bayonet. Some can be defeated, and many more weakened, by persuasion through the written and spoken word. Any commander who does not apply this form of pressure on his enemy is failing to "shoot the works." His fault, however, is not as great as is that of the commander who feels that psychological warfare is a last resort weapon or one which can be made to replace combat, once the shooting war has started. The employment of words as a weapon like every other arm must be integrated into the tactics of each campaign and into the strategy of the war as a whole.

Thus, it may be said that psychological warfare is any form of action which serves to reduce the enemy's military or civil will to resist. Many operations which fall under this broad conception affect both the body and the morale of the enemy. Some affect his finances and his morale. Still others affect only his morale. During the recent war the expression came to be regarded as referring only to the last category; this is, operations which are conducted for the purpose of affecting enemy moral only, and depend upon mental or moral persuasion rather than force of arms.

Though it might be more accurate to refer to such operations as propaganda and reserve psychological warfare for the broader concept, the term is here used in the common and restricted sense.

Examples of Political Psychological Warfare

It is appropriate at this point to recall

some of the forms taken by psychological warfare in the recent war.

When Lord Haw Haw and other minions of the Goebbels Ministry of Public Enlightenment and Propaganda filled the air with praise of the blessings of the Third Reich; threatened or cajoled their neighbors, and proclaimed the might of the German armed forces, they were engaged in psychological warfare.

When BBC, "The Voice of America" and ABSIE (American Broadcasting Station in Europe) covered Europe and other parts of the enemy areas with news of the progress of the war; when they emphasized the growing might of the "decadent" democracies; when they sent messages of encouragement to resistance groups in subjugated countries; when they promised punishment of leaders who prolonged an aggressive, senseless and hopeless war; and when they emphasized that the Allies were not seeking vengeance but aimed to establish a peaceful world where the Four Freedoms could be in possession of the common man, they were engaged in psychological warfare.

When the Allies disseminated leaflets and magazines covering these and other themes over enemy territory from long range aircraft; that, too, was psychological warfare.

These are examples of psychological warfare which was primarily political in nature. Although an effect on the enemy armed forces was desired and expected, they were aimed more directly at the individual as a citizen rather than at the soldier. We will refer to such operations as political psychological warfare. Such a designation is not strictly accurate but it is better than "Strategic" and does carry a connotation which is generally understood.

Examples of Military Psychological Warfare

When loudspeakers informed the Ger-

man commanders of isolated garrisons in the Cherbourg area of their plight and assured them of treatment according to the Geneva Convention and thus facilitated the surrender of some 2,100 Germans, that was psychological warfare.

When the British substituted leaflets for smoke canisters in their base ejection shells and used them to disseminate safe conduct passes and instructions on how to surrender, to isolated garrisons and to areas just in the rear of the front line—that was psychological warfare.

When mobile radio broadcasting transmitters were employed to send news of the continuous defeats of others of their forces to the Germans bottled up in Lorient, and transmitted actual broadcasts by members of that garrison who had surrendered—that was psychological warfare.

When loudspeakers on the banks of the Elbe, in the zone of action of the 83d Division in late April 1945, in full view of the enemy shore, instructed German soldiers under what circumstances they would be accepted as prisoners—that was psychological warfare.

When the Commanding General of the 79th Division used the burgomaster of one town to telephone to the town ahead and arrange for its surrender—that was psychological warfare.

When the Germans spread false messages, rumors and instructions among retreating refugees in Poland, Belgium and France to cause traffic jams and disrupt plans for organized withdrawals—that was psychological warfare.

When leaflet newspapers were distributed to the German forces they achieved such a degree of popularity that there is at least one quite well established incident of a German unit sending over a representative to complain that an issue was overdue—that, too, was psychological warfare.

These last examples are illustrations of what we will call military psychologi-

cal warfare. They were designed to depress the soldier's will to fight, and to bring about a favorable situation in the combat zone. Again we recognize that the term is perhaps not precisely accurate, but it will serve our purpose.

The Twilight Zone

In between the two extremes of pure political and pure military psychological warfare there were numerous operations which were either mixtures or amalgamations of both. "Tokyo Rose," "Axis Sally," "Jerry Calling" and "A Yankee Speaks" were well known programs which had both civilian and military targets. Similarly, broadcasts and leaflets which listed the Japanese cities that were earmarked for bombing by our B-29s (and were in fact attacked) were designed to have an effect on both the citizen and the soldier.

Even though such operations fall in the twilight zone between pure political and pure military psychological warfare, the interest of the military to insure that policy and security are coordinated is clear and unmistakable.

Interrelation of Military and Political Psychological Warfare

The important part which the influence of political propaganda can play in war was demonstrated in the fall of Russia in 1917, the disastrous retreat of the Italians in 1918 and the collapse of Germany at the end of World War I. The devastating effect on the German civilian will to fight, caused by constant repetition of the Fourteen Points, was obvious.

On the allied side the importance of the link between civilian and military morale was recognized by General Pershing, who is reported to have stated that he would smash the Germans in France if authorities in the United States would "smash the damnable Hun propaganda at home."

The part which propaganda played in the defeats of Poland, Holland and France

in World War II is well known. Although research has not yet been completed we have enough definite information from opinion pools, interrogations, letters, etc., to show that United Nations' political psychological warfare was just as effective, if not more so, in bringing on the defeat of Italy, Germany and Japan in World War II.

The importance of having military agencies support propaganda and political psychological warfare by providing guidance, intelligence and logistical support rests not on expediency but on the sound military axiom that weakened morale on the home front has a corresponding effect on the soldier in the field. Every combat soldier knows this to be a fact. Therefore, the political propaganda effort needs the support of military agencies to render the maximum aid to the military program. This does not mean that political themes must or should be used in military psychological warfare, nor does it mean that civilian propaganda agencies need have any other than a broad policy advisory role in any military psychological warfare agency. It does not mean that all demands of political propagandists on the military are sound and need to be met. The military effort in war is designed to further the national policy. Political psychological warfare must, therefore, give highest priority to aiding the military effort subject only to the principle that long range national policy is not jeopardized.

Black Psychological Warfare

So far we have mentioned only those operations whose source was not concealed. They were either openly Allied or German in every case. Such operations are referred to as white propaganda or white psychological warfare. Both sides also engaged in operations purporting to originate from enemy sources. These are usually called black propaganda or black psychological warfare.

In the written field, black operations employed faked memoranda of various sorts. One which appeared as though it might achieve success, outlined circumstances under which German commanders were authorized to surrender their commands. Both sides circulated instructions on how to avoid hazardous duty and how to malingering. Rumors and instructions concerning uprisings by displaced persons were spread by line crossers, agents and through leaflets. Posters and stickers bearing slogans of alleged clandestine organizations were disseminated.

In the radio field, the plan behind such operations is to broadcast news and entertainment to build up an audience and confidence. Then, at the time deemed most appropriate, false stories to stir mistrust, opposition or open revolt can be disseminated. These stations broadcast much of the kind of news in which the German people were avidly interested but which the Nazi stations feared to transmit. One black station caused British listeners to remonstrate with BBC for not achieving the same high standard as "the enemy."

Black psychological warfare requires tight and brilliant control. It is very doubtful whether much was accomplished by it that could not have been accomplished by expending the same amount of effort in "white" propaganda.

The Media of Psychological Warfare

The specific examples cited, and the general considerations just mentioned, need now to be amplified by a more detailed consideration of the means used in this kind of warfare. This means or media may be grouped into four main classes: spoken, written, pictorial and material. Included in the spoken form are radio (fixed and mobile), loudspeaker (airborne and vehicular) and direct oral address. The written form included leaf-

lets, pamphlets, wall sheets, stickers, newspapers and books. The pictorial form covered posters and still and motion pictures. The material form included seeds, needles, small incendiaries, pencils, etc. Ordinarily the latter were used to insure that a written or pictorial form which accompanied them was read.

All forms were used with varying degrees of success throughout the war. It is therefore pertinent to consider the capabilities and limitations of each.

The spoken word was disseminated in several different ways: by radio, by loud speaker and directly.

Radio

Radio found its best application in the standard broadcast stations. Public and privately owned stations were enlisted in the program. In England the Ministry of Information was created and the British Broadcasting Company (BBC) was very quickly "mobilized" for war. In the United States, progress was slower. When, before the war, some far-seeing and ambitious citizens saw that the United States was losing prestige because it had no spokesmen to counter the German and Japanese propaganda machine or to present its case to the world, they organized to do something about it. Other nations were doing an organized job of presenting their side against Axis charges and were gaining friends and supporters by steadily informing the world of their "way of life," their national aims and policies. Ultimately the organization of OWI put the United States effectively into their international battle of words.

As the war progressed, radio broadcasting was extended by bringing in liberated stations such as Radio Luxembourg, and captured stations such as the one at Bari were turned to our own use. New stations were constructed in North Africa and the Pacific. The nature of their broadcasts was primarily what we have

earlier referred to as "political." There were exceptions as indicated below.

The broadcasts from the United States initially were either shows prepared by, or with the help of such agencies as OWI, or they were rebroadcasts of ordinary commercial programs. Later programs were prepared abroad, in London (ABSIE), North Africa and Luxembourg. Many of the programs prepared abroad had direct military significance and were in fact prepared by theater or army group psychological warfare units. Some of these last-named programs were directed at the enemy troops. Others were prepared in furtherance of military government, while still others were aimed at the enemy home front.

The most effective broadcasts were news and news commentaries. These served to get information favorable to us to the enemy troops and populations. They also fed the underground and resistance press and leaders with valuable material. A news file at dictation speed aided the latter purpose and supplied material for the allied press established within Germany, beginning shortly after the seizure of Aachen.

Radio broadcasting to front-line troops from mobile transmitters in the field found only limited employment. The consensus of opinion of the experts in this field was that it was purely a weapon of opportunity and that, under conditions such as obtained in the European theater, mobile radio facilities could more profitably be used as a means of communication for transmitting intelligence and suggestions for broadcasts prepared at permanent home stations.

A concomitant of radio broadcasting was the provision of radio receivers. Prior to the Normandy landings it was feared that destruction and confiscation of radio sets and interruption of power sources might be so widespread that receivers would have to be provided to enable com-

manders to dispel rumors in the wake of battle, to disseminate military government instructions and to facilitate the prompt reestablishment of information services in liberated areas. For similar reasons it was deemed advisable to plan for the provision of a limited number of sets for key individuals or agencies in German territory as it was conquered. Both battery and power sets were procured. The need proved to be far less than was anticipated. The ingenuity which people employed to hang on to their radios was amazing. Actually, confiscation and destruction were less than expected, and power sources were generally very quickly restored after the fighting passed over them.

The "Hog Callers"

Loudspeakers were used in tanks, weapons carriers, jeeps and panel trucks. They were an unqualified success. Against much initial opposition, plans for the provision of one per division were set up. In the end, the demand for them could not be fully met. The advantages and disadvantages of the various mountings are fairly obvious. The panel truck was least satisfactory for combat duty but was useful in the rear areas.

The loudspeaker found use not only for operations against the enemy but served as a means of disseminating news, music and instructions to our own troops and for disseminating information and orders to liberated and conquered populations. In many cases it was the chief means of facilitating prompt control of areas in the wake of battle.

The ultra-load amplifier carried in aircraft found little application, either in Europe or the Pacific. It has many obvious disadvantages, but seems to offer interesting possibilities for the future.

Direct Address

Direct oral address found only limited

application and then only in connection with clandestine operations; black propaganda and sabotage.

The various media of the written type were leaflets, pamphlets, wall sheets, stickers, books, newspapers, and material means.

Leaflets

Leaflets varied in size from the small spacers in leaflet shells to the ordinary legal size and, in the case of leaflet newspapers, even larger. They were disseminated by hand, by shell fire and from aircraft.

Dissemination from aircraft was most common and distributed the greatest number of leaflets. Initially leaflets were simply dumped out of one or more aircraft during raids or from planes diverted from the bombing area. A leaflet bomb was ultimately developed. It was in reality a bomb case filled with leaflets and fitted with a barometric fuze to cause it to open at the desired altitude. Because of the difficulty of securing time and equipment for conclusive tests, the leaflet bomb was never developed to the degree of perfection that was considered attainable. On one occasion a large leaflet bomb dropped intact just outside the CP



Figure 1.

Packing leaflets into a bomb.



Figure 2.

Packing rolled leaflets into a 105-mm smoke shell.

of the 2d U.S. Infantry Division to give a convincing illustration of an error in bombing technique and mechanical failure at one and the same time.

Use of the fighter-bomber eliminated much bombing error. The opening of bombs dropped by it could be somewhat better controlled.

Eventually, one U.S. squadron of heavy bombers was made available to the SHAEF Psychological Warfare Division for leaflet operations alone. This squadron disseminated leaflets, newspapers and pamphlets over areas selected in collaboration with G-3. In many cases the leaflets were military psychological warfare, that is, they were designed to be read by the enemy soldier, but a vast quantity of leaflets and periodicals intended for civilian consumption was also delivered.

The RAF, though it carried great quantities of leaflets, never did develop the technique of leaflet bombing as highly as did the U.S. Air Forces.

The problems involved in leaflet operations include selection of the theme; preparation and transportation of the leaflet; selection of the target; briefing the

crews; loading the bombs and the technique of bombing.

There is one famous case in which, on the request of a combat unit in Normandy, a special leaflet was written and printed in London and dropped by aircraft based some distance outside London within less than twenty-four hours. Such achievements are quite unusual. Normally several days were required. To keep this time to a minimum, leaflets were prepared in anticipation of events. This was done by getting forecasts of events from G-2 and G-3. On this basis, leaflets were prepared in advance of the capture of Cherbourg, the liberation of Paris, entry onto German soil and many other critical events. The one for Brest was "on ice" for a long time.

Certain standard themes such as the safe conduct (*Passierschein*), testimony of prisoners and other evidence of fair treatment of prisoners, the ring-of-forces-closing-around-Germany, surrender instructions and why-waste-your-life-in-a-lost-cause were kept in stock and in some cases loaded for use on call. In such cases a fighter-bomber mission could in favorable circumstances, be dispatched within four hours.

Political or semipolitical leaflets were dropped in accordance with plans originating in or approved by SHAEF where there was close affiliation with civil agencies. Planning the more strictly military leaflet operations was done in coordination with G-2 and G-3 and often on request of subordinate commands.

Fighter-bomber leaflet operations were normally controlled by Army Group or Army, and were almost entirely military in character. In the interests of coordinating campaigns and avoiding waste effort, it was found advisable to keep the different echelons mutually informed of all leaflet operations.

The base ejection smoke shell of the

British 25-pounder was early found to be a very useful means for leaflet operations against a particular small area or unit which required pin-point accuracy. The 105-mm howitzer shell served the same purpose in the U.S. Army (see Figure 2). The 155-mm shell could be used but was considered less desirable. For a number of reasons, research of this technique in other calibers and weapons was not adequately carried out.

The problems in the case of dissemination by artillery included the preparation of the leaflet, securing the ammunition, unloading the smoke canister and loading the leaflets, indicating the target to the artillery, getting the loaded shells to the proper battery or guns, and the technique of firing. Loading is a time consuming job and requires a measure of skill. The allocation of ammunition for leaflet purposes raised many questions of priorities particularly during periods of ammunition stringency.

✓ When printing facilities were available in the field, firing leaflets in artillery shells was one of the most expeditious ways of getting psychological material to a close-in target promptly.

As might be supposed, there was some initial disinclination to "waste" bombs and shells to carry "British Science." However, when it became routine to give air and artillery units translations of the material they distributed and to inform them of the evidence of results achieved, the best of cooperation followed. This critical scrutiny of operations also had the salutary effect of making psychological warfare zealots keep their feet near the ground. The very nature of the operations and the type of people who were usually involved in psychological warfare (advertisers, public relations specialists and newspapers and "intellectuals") indicated that such a check rein was needed in many cases.

The release of propaganda-bearing balloons was not used in the forward combat areas in this war as it was in World War I.

Dissemination by hand found its widest use in connection with the operations of patrols and agents in enemy areas. It was limited in scale and there is little evidence concerning its effectiveness.

News was the most valuable propaganda. Factual news, giving a picture of the progress of the war which the reader could verify, established confidence. It therefore provided a vehicle for inculcating defeated sentiments. Both the spoken and the written form were most effective when they hinted at surrender rather than asked for it, and when they described a way to surrender and provided a token or pass for that purpose. Such ideas served to weaken the enemy resistance even when they did not induce open desertion or surrender.

A conception of the scale of leaflet operations may be secured from the following facts. Using the $5\frac{1}{2}$ "x $9\frac{1}{2}$ " leaflet as standard, a 105-mm shell can carry about 500 units; a T-3 bomb used in



Figure 3.

Packing an artillery leaflet shell into a container. Note that a copy of the leaflet is inserted in the top of the container.

fighter-bombers, about 14,000; and the T-1 used in B-17s, about 80,000. It is estimated that over 3,000,000,000 leaflets were dropped in enemy or enemy occupied territory during the European Campaign. These operations required the exclusive use of 80 percent of the offset printing capacity of the United Kingdom at one stage of operations. Roughly 90 per cent of the leaflets were disseminated from heavy bombers, 5 per cent by fighter-bombers and 5 per cent by artillery.

Leaflet newspapers distributed by aircraft reached a "circulation" of 2,000,000 copies per issue. One of them was a four-page daily paper of around 11,000 words.

Available records indicate that in the campaign in northwestern Europe roughly 75 per cent of the prisoners taken had seen Allied leaflets, and that 75 per cent of these were influenced by them.

Pictures, Books and Posters

The pictorial means were used almost exclusively for operations in our rear areas. The chief exceptions were pictorial leaflets and magazines which were disseminated to both enemy troops and enemy civil populations in front of our forces. Posters, picture displays, books, and motion pictures found application only in connection with the restoration of information services in liberated or captured areas. They were particularly effective in showing the French and other allied peoples whose information services had been under Nazi control for a long period of time, what the U.S. and British peoples had suffered and accomplished to ensure the liberation.

A display of some 250 photos attracted 3,000 people a day in Paris and was seen by almost 7,000,000 people during a three-months tour of some forty-three cities in France.

Material Means

The material means most commonly

used were small items regarded highly by relatively primitive peoples. These things were packaged with pictures or designs depicting the power and friendship of the United Nations. In some cases short messages and instructions were included. Needles and seeds were particularly effective in Burma. They were disseminated from aircraft.

In several operations in Europe small incendiaries were dropped with instructions for their use. It was presumed that they would be viewed as originating from a subversive source. The operations involving explosive pens and pencils have all been well published. Here again, the value has not yet been fully determined.

Satellite Operations

No discussion of psychological warfare would be complete if it did not indicate the ancillary activities which psychological warfare agencies carried out. These may be classified under four main headings; contributing intelligence; facilitating the reestablishment of the information services (press, radio, motion pictures, periodicals, books and music) in liberated countries; controlling these services in enemy territory and facilitating the initiation of operations abroad by the civil information agencies of our own government.

Intelligence

The intelligence requirements for psychological warfare operations are enormous. This applies both to the political and the military form. One need only consider the words that can be spoken over one transmitter in one day to gain a conception of the vastness of the requirement. The more nearly such operations are military, the greater the demand for military intelligence. The political propaganda agencies can give the best support to military psychological warfare only when they have lots of material normally procurable only through military intelligence.

Among the kinds of items needed are: recordings of battle and behind-the-battle scenes; talks by prisoners, refugees and escapees; important speeches, orders and proclamations by key commanders; communiques; captured reports, letters, orders and other documents; descriptions of liberation policies and procedures and surveys of reactions to our own forces and to military government. It is also essential that routine order-of-battle information be supplied and supplemented by information on enemy personalities and units. Obviously, no intelligence stone bearing on the status of enemy morale can be left unturned.

In the course of searches for intelligence for their own operations, psychological warfare personnel uncovered much information of value to counter-intelligence, war crimes and military government. In addition to this acquired intelligence, many of the persons engaged in psychological warfare had a broad background of knowledge of Germany secured through study or resistance in the country. This enabled them to give advice and suggestions of operational, supply, political and economic importance. They also had valuable suggestions to make concerning many potential sources of intelligence and important personalities. Furthermore, there was a high percentage of linguists in psychological warfare units. In many cases such persons performed essential and purely military jobs in aiding troop commanders and military government personnel.

Experience in the war indicated that the principles and indications concerning soldier morale long understood in our services were applicable to both enemy and friendly troops, and that the most effective psychological warfare operations were those based on this premise. Too many psychological warriors acted as though a special intelligence and intui-



Figure 4.

The first issue of *La Presse Cherbourgeoise*, the first full-scale formal daily newspaper to be published freely in France after D-day, appeared a few days after the city was liberated. C. Daniel Yon, center, the editor, hands a copy to Maj. (then captain) Patrick Dolan, left, of the First U.S. Army psychological warfare team. The other officer is Maj. (then captain) Fernand Auberjonois, who was largely responsible for initiating publication of the paper. Assistance to the French editor was taken over from First Army by the Allied Information Service.

tion were required to prepare an attack on the morale of enemy troops. This not only caused some commanders to suspect their judgment but also led to needless duplication of effort. When and where full integration with the normal military intelligence operations was achieved, the best results were secured.



Figure 5.

War Department sound truck gives instructions to a crowd of bewildered Displaced Persons, former slave laborers, after their liberation in Darmstadt, Germany. This is the type of amplifier which was used for addressing enemy troops. Mountings in jeeps, armored cars and tanks were also used.

Aid in Restoration of Information Services in Liberated Areas

The second ancillary task performed by psychological warfare agencies in World War II—reestablishment of the indigenous information services, was particularly important in France. After curtailment and constant control of such enterprises by the Germans, the French people were eager to set up a liberal press and radio and to reestablish the other information services under their own control. Depredations by the Germans, loss through air attack and during combat created a big transportation and supply problem. Equipment, spare parts for radio, press and motion pictures, newsprint, non-German news films, ordinary films of allied origin, books and magazines which had been barred by the Germans, all these and many more items had to be procured, packed and transported. The allied efforts

and intentions had to be advertised in posters, periodicals, films and over the radio to counteract the doubts and suspicion which the Germans had fostered for years through an agency which in Paris alone comprised over 1,100 people. The job had to be done and no other agency except the armed forces could do it. The task fell to the psychological warfare units. Beginning with Normandy, responsible Frenchmen were aided in opening the presses (see Figure 4), radio stations and motion picture theaters. During the combat stages and until the normal means could be reestablished, mobile transmitters powered certain French radio stations and public address systems disseminated news and music to civilian populations (see Figure 5). Mobile presses printed news sheets, and portable projectors were used in motion picture showings. This process was repeated in other liberated countries.

Controlling Information Services in Enemy Territory

When the Allied armies got into Germany, information services had to be established and controlled. First, the location of Nazi information service agencies had to be determined. They had to be thoroughly investigated to prevent the effective establishment of underground means to support such clandestine organizations as were disclosed and raided in March 1946. Nazi sympathizers had to be ousted from all connection with these services. Secondly, responsible and reliable Germans had to be found and trained to take over management of activities which the Nazis had controlled with an iron hand for some eleven years. It became necessary, initially at least, to have Allied officials actually operate most of these agencies with Germans doing only the routine jobs. Again, since the armed forces, by the very nature of things, controlled transport and supplies—this task

fell to the military and specifically to the psychological warfare agencies.

Facilitating Transfer to Civil Agencies

Both the United States and Great Britain had civilian agencies which could eventually take over the last two functions, assisting in reestablishing information services in liberated countries and controlling such services in enemy country. But until the military situation was such that space, supplies and transport could be provided, the personnel could be housed and fed only through or by the military. The military was, of course, anxious to get out of this business and hence attempted in every way to facilitate transfer of this function from military to civil control. Problems already mentioned, plus security considerations and the requirement of military control to insure full support of military operations, served to delay this transfer until early 1945 in France, and even later elsewhere in liberated areas. It is still not complete in Germany and Japan. As things worked out, it appears in retrospect that more was done in the military phase that was essential, and that earlier operation under civilian

agencies, within limits specified by the theater commander, might have been possible.

Since the information services play such a large part in civil government, these tasks seem logically to be a part of civil affairs and military government, and hence should be undertaken by civil affairs sections rather than by psychological warfare sections. For several reasons this was not done initially in the European Theater. However, current manuals and instructions on civil affairs and military government recognize this subject as a civil affairs responsibility and this doctrine is sound.

Should our country be involved in another war there will be an even greater need to use both military and political psychological warfare. If this sketch of the means and methods employed in that means of combat during World War II and of the functions which were performed by agencies conducting psychological warfare serves to stimulate the thinking and imagination of those who will be charged with preparing for and fighting such a war it will have served its purpose.

The safety of the democracy of the United States lies in the solid good sense and unshakable conviction of the American people. They need have no fear that their democratic liberties will be imperiled so long as they continue fulfilling their duties of citizenship.

President Harry S. Truman

The Battle of the German National Redoubt

— Operational Phase

Brigadier General Reuben E. Jenkins, *United States Army*

This article supplements another by the same author "The Battle of The German National Redoubt—Planning Phase" that appeared in the December issue of the MILITARY REVIEW.—The Editor.

The Decision

ON 14 April SHAEF completed plans for the next major offensive. These included a material shortening of Seventh Army's front by shifting Third Army, under Twelfth Army Group, to the west for the attack in the direction of Linz to establish contact with the Russians advancing from Vienna, and assigned Sixth Army Group the principal attack mission of clearing up the remainder of south Germany and seizing western Austria (the Redoubt Center) (see Map No. 1). This shortening of the front, plus one additional armored and two infantry divisions and the airborne division released by SHAEF, gave Sixth Army Group the offensive power required.

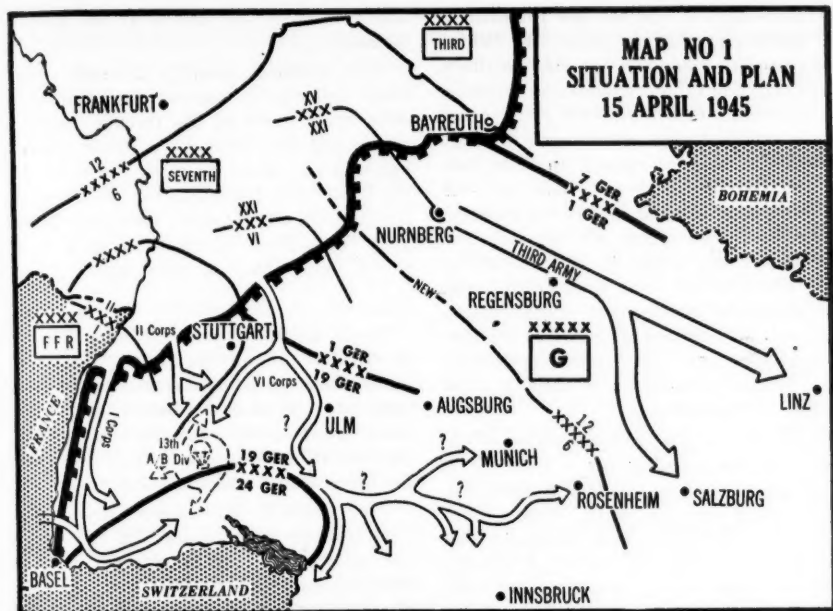
On 15 April Sixth Army Group was directed to launch the operation to destroy the Nineteenth German Army as quickly as possible, but was directed to hold its left back until the Third Army was ready to open its offensive, probably about 22 April, and thereafter to have the left protect the south flank of Twelfth Army Group as it moved into its new zone.

If the Third Army did not make the

progress hoped for, because of strong German reaction from Czechoslovakia, the Sixth Army Group would, after the battle on its right wing, be in a favorable position to swing to the east to cut off any movement into the Redoubt Center battle later.

German Psychology and Morale

Conduct of the battle on the front of Sixth Army Group had to take into serious account the psychology of the German and his present state of morale. The First and Nineteenth German Armies had been heavily mauled west of the Rhine. During the last three weeks they had recovered very substantially in both strength and equipment, but their morale was not good. German individual replacements were not up to standard. Except in a few critical areas where resistance was offered with the usual fanaticism, the Germans were now manifestly "jumpy" and raced for a rear position when confronted with a strong, decisive attack. The violence of the American and French artillery, armor and air was taking the willingness to fight in open country out of them. Furthermore, indications pointed to the fact that German intelligence was poor, and that their signal communications system was breaking up. The German air effort was now practically zero, while our own was "perfection" itself. These latter factors meant that German Army Group G and its armies could know little about what was going on in rear of the Sixth Army Group,



GERMAN DIVISIONS

In Line

1st Army: 409th, 416th, 79th, 212th, 9th, 353d, 246th, 719th Infantry; Massenbach Panzer Division.

19th Army: 559th, 465th, 16th, 257th, 106th, 189th, 405th, 716th Infantry; 1005th and Bauer Infantry Brigades (10 Bns).

In Reserve

1st Army: 616th, 2d, 198th Infantry; 17 SS Pz G; 25th SS (Inf); Von Hobe Pz G Brig.

19th Army: 805th, 47th Infantry.

Note: Of the above, 719th and 246th were remnants; 2d Infantry Division was reduced strength and was refitting.

Bns of 1005th and Bauer Bgs were about 350/500 each.

Other divisions averaged about 7/900 each.

805th was completing mobilization.

and could achieve coordinated reaction to attack only slowly. The possibilities for surprise were good. However, if the weight and direction of any major effort east of the Black Forest were disclosed prematurely, the Germans would run and might reach the Schwabische-Frankische Alps ahead of the French and Seventh Armies' spearheads, where a major, costly offensive would be required to dislodge them.

This was the situation most to be avoided by Seventh Army and the French.

Seventh Army, therefore, almost invariably employed narrow, small scale initial offensives, at selected points, so as not to alarm the Germans unduly or prematurely. These offensives were continued until a break had been effected in the German lines sufficiently wide for its purposes, but not of such size as to alarm the

Germans until it was too late for them to do anything effective about it. Behind the breach would be armor, artillery, engineers and infantry loaded on anything rolling onto which a rifleman could hang. These mobile troops would pour through the gap to selected critical spots in rear of the Germans, fan out, join up with flanking penetrations, isolate the thus encircled Germans from all supplies and assistance, and assist in their annihilation while at the same time establishing a semblance of a new front in the German rear, or continuing exploitation to the rear as resources and the situation permitted. The French employed the same general pattern of operations.

However, for the coming major offensive sufficient mobility for a large scale exploitation could be provided for only one main attack corps in Sixth Army Group, and even that was not fully adequate. The French were woefully short of trucks, while Seventh Army could muster only enough for minor, local exploitations for its center and left corps after providing the minimum requirements for its main attack corps. Hence, the plan of attack provided that the French should launch only a strong, local offensive *west* of the Black Forest initially to clear the Rhine Plain; *east* of the Black Forest its main offensive would *await a complete rupture* by the right corps of Seventh Army. Seventh Army would mass its means behind its right corps for a cyclonic exploitation through a breach in the First German Army east of Stuttgart into the rear of Nineteenth Army, while its center and left corps would exert the pressure required to hold the remainder of First German Army in position, taking full advantage of their limited capabilities for local exploitations against isolated groups while moving into their new zones of action, as the front was tightened by the movement of Third United States Army. The airborne division would be dropped

ahead of the main attack at the proper moment.

With sufficient mobility, Seventh Army could undoubtedly destroy the First German Army north of the Danube with its center and left corps by multiple frontal penetrations, while its right corps cut off the Nineteenth German Army in the west. But the required trucks were not available. The First German Army's turn would simply have to come later.

The Attack

On 18 April, VI Corps (Major General E. H. Brooks), on the right of Seventh Army, had its preliminary attacks well under way. West of Stuttgart the French remained relatively quiet, but were carrying violent battle to the Germans between the Black Forest and the Rhine.

The German Nineteenth and First Armies stood their ground. The VI Corps met determined resistance and did not effect a clean rupture until late 20 April. The II French Corps on its right *anticipated* the rupture and launched a powerhouse offensive west of Stuttgart on 19 April of such weight and violence that it had effected a breach all the way to the Rhine (see Map No. 2) by 20 April, and was encircling Stuttgart. The Sixth Army Group promptly cancelled the airborne assault which was now mounted for daylight 22 April. It was obvious that the airborne attack would be of no effect. In fact, its target area would be overrun by French ground troops before 22 April.

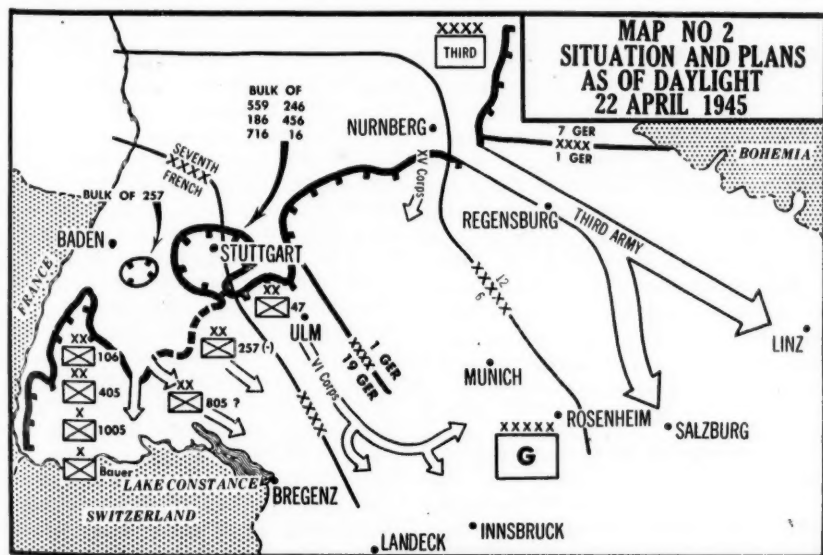
By 21 April the weight and momentum of the II French Corps attack had carried its exploiting troops across the Neckar River, well into the zone of action of the VI Corps and well south toward the Swiss border (see Map No. 2). In the meantime, the VI Corps had encircled Stuttgart from the east and connected up with the II French Corps. The French were definitely closing the trap on two divisions and two brigades of ten battalions in the Black

Forest, with extremely weak forces. Only about two and one-half divisions and scattered units were now known to lie between the VI U.S. and II French Corps and the Redoubt Center, and one of these was soon to be overtaken and cut to ribbons by airpower, speeding tanks, tank destroyers and mechanized cavalry. The Twenty-fourth German Army on the Swiss border was long since ineffective. This habit of holding onto dangerous ground too long had brought the Germans another disaster; this time a stupendous one. The Nineteenth German Army had not simply been defeated, or crushed. It was destroyed as an army, thus opening up the whole west end of the German front to practically unopposed envelopment.

The Germans in the upper Rhine plain began a hasty withdrawal. The French, in a supreme effort to cut them off, placed the exploitation burden now on the weaker I French Corps which raced up the Rhine plain to the Swiss border, turned east, broke through swiftly on 26 April and

covered the next forty-eight kilometers toward Lake Constance in fifty-five minutes with an armored/motorized column. This column fanned out and soon joined the French moving south on the east side of the Black Forest. Now, with Stuttgart, the Black Forest, and several isolated areas to mop up, the French Army had little left with which to exploit farther towards western Austria. However, the bulk of one armored division, with practically no infantry, cut off the German 805th Division and moved on around Lake Constance until it ran out of gasoline and practically all other essentials. It then halted and established a screen pending the arrival of infantry and supplies.

Although the attack was a great success, some disappointment was felt in the Sixth Army Group. It was felt that the attack of the II French Corps was premature by at least thirty-six to forty-eight hours, and had resulted in the escape of the bulk of what few units of the Nineteenth German Army had managed



to avoid destruction. The strength and mobility of the II French Corps were not equal to the tasks of isolating Stuttgart and at the same time exploiting *sufficiently deep* with strong forces after a frontal effort against the Nineteenth Army. On the other hand, the VI U.S. Corps was strong in armor and mobility, and was attacking in the zone of the first German Army, from which it would exploit rapidly with strong forces to Lake Constance, deep into the rear of the Nineteenth German Army, *from its flank*. The local and general reserves which were so closely backing up the Nineteenth Army's front opposing the French, instead of being drawn forward or at least held in place by strong local attacks until VI Corps was ready to deliver the *Coup de Grace* in conjunction with the airborne assault, were plunged into headlong flight by a premature major offensive on a broad front that exploded with unexpected violence, but without the proper power and mobility to exploit deeply. On the other hand, the German 47th Division (in reserve) was pulled into battle promptly by VI U.S. Corps and could not get away.

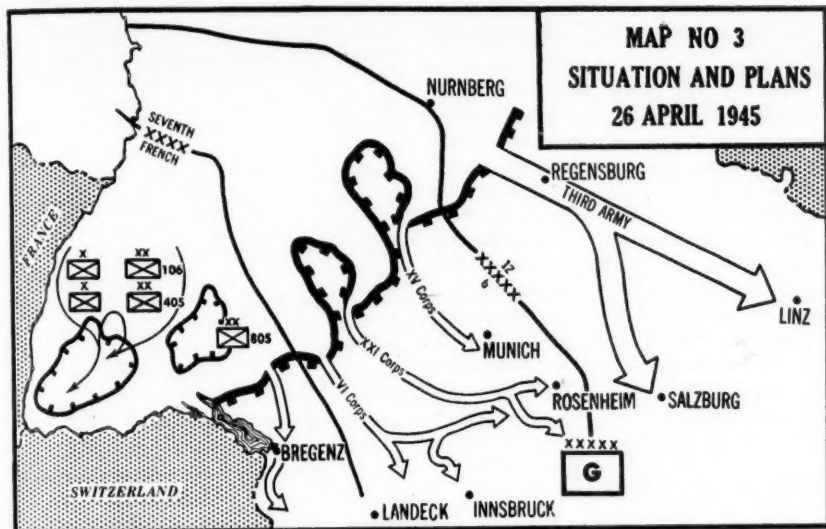
The Nineteenth German Army was already jittery, and it was vital that no part of it be alarmed prematurely. Furthermore, it was highly important to the subsequent pursuit phase that the First French Army not so exhaust itself initially that it would be incapable of a material effort on the right of VI Corps to the east. But now its strongest corps had exhausted itself executing a task assigned primarily to the unused, airborne divisions and the powerful VI Corps, the main attack corps of the Group.

The Pursuit

This unexpected turn of events demanded an *immediate* redirection of the VI Corps and a new zone of action for the French (see Map No. 2). The VI Corps, moving south against scattered resistance,

approached Ulm on 23 April only to collide again with an armored element of the French which was moving east on Ulm instead of south. After some confusion and delay, the VI Corps renewed its drive on its right, and was well to the south of Ulm by dark 25 April, prepared to begin a swing to the east on order (See Map No. 3).

In the meantime, the XXI U.S. Corps (Major General F. W. Milburn) and the XV U.S. Corps (Lieutenant General W. H. Haislip), in the center and left of the Seventh U.S. Army, were carrying out their part of the plan. The XXI Corps had been moving slowly south into its new zone of action, busily preparing the way for a local breakthrough from its left, with the hope of encircling several divisions of the First German Army by beating them to crossings over the Danube with at least one regimental combat team and armor, and then fanning out behind them and joining eastern elements of VI Corps. It managed to accomplish a goodly portion of this on 26 April. The XV Corps had been having an exceedingly rough time of it at encircled Nurnberg, where elements of three German infantry divisions, led by formidable elements of the 17th SS Panzer Division, had offered a fanatical and useless defense, fighting almost to the death and, incidentally, to the death of Nurnberg. But Third U.S. Army had now taken over in that zone, and XV Corps, after releasing its armored division to Third Army, was moving with time table precision south into its new zone of action, paving the way for a local breakthrough from its left to join up with the east flank of XXI Corps, which it accomplished on 26 April. On the map it might look as if XXI and XV Corps had been "dragging their feet." They had been moving slowly, but for a definite reason and as a part of the master plan. The regrouping of Third Army for its drive had to be concealed and protected.



DESTROYED BY XXI and XV Corps: 719th and 89th (a new arrival).

DECIMATED BY XXI and XV Corps: 198th, 2d, 79th, 17th SS Pz G, 416th, 353d, and 19th (a new arrival).

NEW ARRIVALS, 1st GERMAN ARMY: 151st Tng Div, 553d (Remnants), 616th (Staff and few new elements).

DESTROYED BY FRENCH: 106th, 405th, 805th, and 1005th and Bauer Bgs.

Furthermore, they were holding the First German Army in position and decimating it until the right wing of Sixth Army Group could reach a position from which it could be assured of cutting off the German First and Seventh Armies from the Redoubt Center. A less skillfully conducted direct pressure pursuit by these two corps would have permitted the First Army to break loose and flee.

The long lines of communication soon began to drain strength from the Seventh U.S. Army. Though the Germans in rear areas appeared to be as docile as cattle, the possibility of sabotage and assassinations was an ever present, disturbing element. No opportunity for these to break out could be risked. All non-essential combat troops, such as antiaircraft artillery and heavy artillery, had long

since been grounded and converted to security troops, while their trucks were employed in tactical troop movements. The more essential combat troops were now also being converted into security troops at the rate of about seven battalions per day. This could not continue indefinitely.

Fortunately, the Redoubt Center was not now so far away. The First German Army's flank was practically wide open. The VI Corps was meeting isolated, but fanatical, resistance, and it was deep past the flank ready to start a swing east. The French were now closing their few remaining reserves east of Lake Constance. The XV Corps had broken the First German Army's right flank loose from the Seventh German Army. Despite its diminishing power, Seventh U.S. Army could only continue to look south and east and

—"keep going until you run out of gasoline, supplies and troops." The trap was now set.

The Swing East

At noon 25 April, the Army Group commander, after personal conference with the Commanding General, Seventh Army, and the Chief of Staff of First French Army, issued oral instructions to them to close the trap and plunge into the Redoubt Center. He studiously avoided the use of the word "pursuit," apparently because all too frequently it is interpreted to mean "throw caution to the winds." The French were directed to plunge into the Alps at Bregenz and move on Landeck. Seventh Army was directed to start a mighty swing with the VI and XXI Corps and the right of the XV Corps around the south of Munich and seal off the Alps in zone; the VI and XXI Corps were to drop off strong forces along the Alps passes and drive on Innsbruck and the valley of the Inn River (see Map No. 3).

On 28 April, VI Corps was against the Redoubt Center with its right and center, while its left was moving east as the XXI Corps' right swung wide around the southwest of Munich, meeting stiffening resistance. The left of the XXI Corps, and the XV Corps were still "holding" the right and center of the First German Army west and north of Munich. The left of the XV Corps from advanced positions, was protecting the right of the Third Army which was heavily engaged with the Seventh German Army at Regensburg. Certainly, only a miracle could preserve the Redoubt Center for long.

However, bits of disturbing information and rumors were coming in fast. Himmler was reported in Munich. Information indicated that thousands of Germans had already entered the Redoubt Center from Italy, southern Germany and eastern Austria. The Deputy G-3, SHAEF, talked over the situation with G-3, Sixth Army

Group by phone after midnight 29-30 April and pleaded for "more speed" to prevent the escape of more Germans into the Redoubt Center. The possible necessity was discussed, of shifting a few divisions to the Seventh U.S. Army from the north where the front was now static, for a quick attack into the Alps. SHAEF was assured that more divisions might be needed for an attack into the Alps, but that very few more Germans would enter the Redoubt Center west of Salzburg, for the reason that the right wing of the Seventh Army was at least forty miles south of the main flank of the First German Army and, despite scattered resistance, was swinging east in everything capable of moving a soldier faster than a walk. Furthermore, the remaining bulk of the First German Army was still north of Munich and could only move by foot.

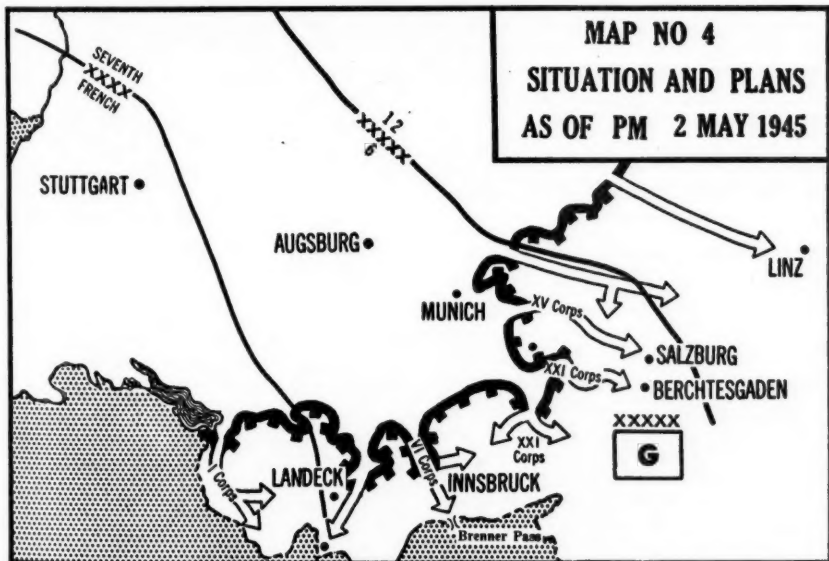
The bulk of the VI Corps had plunged into the Alps for Innsbruck and Landeck, two key points in the Center, while a portion of the VI Corps' left still moved east along the Alps protecting the right of the XXI Corps, which was now driving around the south of Munich to seal the pass at Rosenheim. The XV Corps' right dashed for Munich and around it. This action and the Third Army's advance were pinching the XV Corps out of the fight. The maneuver was magnificent, but pinching out a complete corps at this stage of the battle might actually lengthen the campaign. This was a powerful corps, skillfully led, that had, by the plan of maneuver, been denied the opportunity to participate in the spectacular manner of which it was capable. To deny this corps the opportunity to exhaust itself in a final decisive effort on the Bavarian plains was a proposal that the Corps Commander, the Army Commander, and the Army Group Commander could not, in good conscience, entertain; but for the moment it looked as if the XV Corps would be relegated

to those pages of history, wherein rest practically all secondary attacks and direct pressure operations—however magnificent.

But its opportunity was suddenly presented. The Germans in the Danube Valley and Czechoslovakia suddenly came alive. They were about to be cut off from the Redoubt Center. Their reaction against the Third Army was prompt and violent. The Third Army's left flank was overextended and seriously exposed. Infantry needed with the advancing armored spearheads in the Valley of the Danube had to be diverted to the exposed flank. This retarded the rate of advance. One of the

Third Army's objectives was Salzburg, the last entrance to the Redoubt Center from the north. By 1 May, the XV Corps' right had pushed past Munich, where it left a division on security duty after a heavy engagement, and was facing east. The XXI Corps had pinched the XV Corps out and was almost astride the Seventh Army's and Sixth Army Group's east boundary, facing east (see Map No. 4).

In view of the situation and the importance of closing the Salzburg pass as quickly as possible, the Sixth Army Group requested Salzburg as an objective. Third Army and Twelfth Army Group con-



TRAPPED BETWEEN FRENCH AND VI CORPS: Remnants of: 47th, 246th, 257th, and 559th.

TRAPPED BETWEEN VI AND XXI CORPS: Remnants of 189th, 465th, and miscellaneous Russian units.

CONFRONTING LEFT OF XXI CORPS AND XV CORPS: Remnants of: 2d, 198th, 19th, 553d, 79th, 17th SS Pz G, 151st Tng, Von Hobe Pz G Bg, 616th.

Complete Divs (Reserves): 9th Hungarian (Inf), 25th SS Infantry.

curred promptly by telephone, after which SHAEF, by telephone at noon on 2 May, directed the Sixth Army Group to capture Salzburg and drive into the Redoubt from that point. SHAEF also established a new boundary between the Sixth and Twelfth Army Groups, confirming it by radio the next day (see Map No. 4).

The Seventh Army now turned the XV Corps (which now had the 86th Division, from the right of the Third Army, attached) loose on Salzburg, and at the same time turned the XXI Corps on Berchtesgaden. Both the XV Corps and XXI Corps reacted promptly, broke through the German front, and raced for Salzburg and Berchtesgaden, fanning out in the rear of the Germans as they plunged east. On 3 May they counted over 60,000 prisoners between them, including the complete, reserve 9th Hungarian Division of over 9,000 by XV Corps. By late 4 May, the bulk of the remainder of the First German Army either had been encircled or had escaped east.

The Redoubt Center is Split in Two

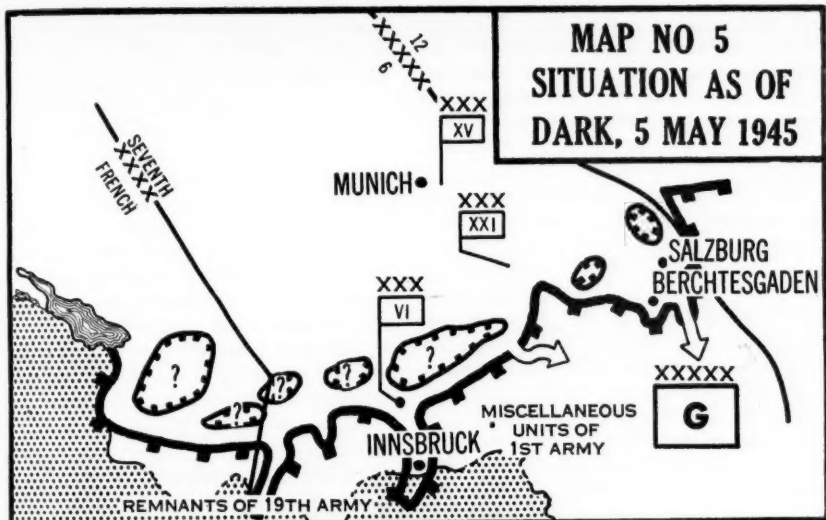
In the meantime, the French were fighting their way into the Redoubt along the Swiss border. The VI Corps had, amid snow storms in the high Alps, captured Landeck and Innsbruck, and had launched an attack south of Innsbruck, behind which strong armor and a mobile Reconnaissance Troop had been posted. These reserves raced completely through the Alps on 3 May and at 1051 were fourteen miles south of the Brenner Pass, in contact with the 88th United States Division in Italy, where the Germans had surrendered the day before. This move so surprised the German units bivouacked along the road through the Redoubt Center, that the flying columns were on them, among them, and through them, before they realized what was happening (see Map No. 5).

Army Group G Surrenders

With Innsbruck, Landeck and Brenner Pass captured, any "Plan" the Germans may have had to hold out in the Redoubt Center was now impossible of execution. The Commander of German Army Group G, General Schulz, definitely had had enough and, with instructions from Field Marshal Kesselring, late 3 May by radio, asked for information as to with whom he should deal for a surrender and how to reach him. He was instructed to contact the Commanding General, Sixth United States Army Group, General Devers, and how and where to reach him. He was also told that if *unconditional surrender* was unacceptable, not to appear for any discussions. On 4 May, Salzburg fell and on 5 May Berchtesgaden (The Eagle's Nest) fell (see Map No. 5) to XV Corps.

Complete confusion reigned in German Army Group G. The remnants of the Twenty-fourth German Army had been absorbed in remnants of the Nineteenth Army and only its staff was intact. The Commander of the Nineteenth Army was surrendering everything in his zone unconditionally to the Commanding General, VI Corps, at Innsbruck, apparently without the knowledge of the Commanding General Twenty-fourth Army, Commanding General First Army or the Commanding General Army Group G. He did not know that the Commanding General of Army Group G had offered to surrender the entire Group. All Germans in the western zone of action were fleeing into the zone of the VI Corps to escape the fury of the French. Troops of the First German Army were coming out of the hills and woods by the hundreds with their hands up.

Since 17 April, the Nineteenth German Army had yielded approximately 200,000 prisoners to the First French Army alone. The Seventh U. S. Army had collected approximately 400,000 from the

**REMAINING DIVISIONS' DESTRUCTION COMPLETED:**

19th Army: Remnants of 47th, 257th, 189th, 465th, 246th, 559th.

1st Army: Remnants of 2d, 151st, 198th, 19th, 36th, 416th, 79th, 553d, 616th, and Von Hube Pz G Bg.

Complete 9th Hungarian.

OPPOSING FRENCH AND VI CORPS: Miscellaneous units.

OPPOSING XXI and XV Corps: Remnants of 38th SS, 17th SS Pz G, 407th and miscellaneous units.

ESCAPED: 25th SS (Inf).

German Nineteenth, First, and Seventh Armies, about 200,000 of them being yielded by First Army since 27 April. These 600,000 prisoners totaled much more than the initial, combined combat strengths of the First French and Seventh United States Armies. It did not seem possible that more than a mere handful of Germans had managed to reach the Redoubt Center. Hence, General Devers was prepared to accept the surrender, of a few higher headquarters and a few service elements in the Alps. Such was the state of German Army Group G after eighteen days of American and French blitz.

On 5 May, General Foerstch, commanding the First German Army, had repre-

sented General Schulz, appeared near Salzburg with his emissaries and requested audience with General Devers at Haar, Bavaria (Headquarters XV Corps) as quickly as possible. He was presented to Generals Devers, Patch (Seventh Army) and Haislip (XV Corps) at about 1330 after having read the unconditional terms handed to him. The terms were discussed, during which he disclosed the sorry state to which the magnificent German Army Group G had been reduced. He gave his listeners an insight to the principal contributing factors, which may be summarized as: superior and violent allied air power which made daylight movement of the Germans practically impossible, violent alliedartil-

lery and armored action, lack of proper German signal communications and intelligence, speed and power of American and French maneuver, and dogged determination to maintain the weight and speed of pursuit to the vital objectives regardless of difficulties.

During the discussion the myth of a "provisioned" Redoubt was exploded. General Foertsch asked that arrangements be made to feed the Germans in the Alps, stating that he had "perhaps six days of food" in the Army Group dumps, and that no other food or supplies were available in the mythical, large underground storehouses of the National Socialists. When asked what number of men from Army Group G were cut off in the Alps, he indicated 250,000, possibly 350,000, in an assortment of remnants. This number astounded his listeners. It did not seem possible. (The final count proved the higher estimate more nearly correct.) The fact that the greatly advertised "Redoubt Center," now holding over 250,000 men, was surrendering so soon was almost unbelievable. General Devers, said to General Foertsch, bluntly: "... Understand, this is *unconditional* surrender!..." General Foertsch replied, with almost uncontrollable emotion: "I assure you, sir, I have no power to do *anything* against this."

Shortly thereafter the instrument was signed which delivered into Allied

hands, as of noon the next day, Europe's strongest defensive position—the Austrian Alps.

Whether the National Socialists really had hoped for a long and final stand in western Austria may still be debatable. It is a rather strange coincidence that such leaders of Junker aristocracy, and in such numbers, as were captured in this area should be found there together. For example, Reich Marshal Goering, Field Marshals Von Rundstedt, Von Leeb and Wilhelm List, and Admiral Horthy of Hungary were all rounded up along with approximately 460 general officers of lesser importance.

The total bag of prisoners of war of Sixth Army Group since 17 April now was slightly over 900,000. It had, indeed, been a glorious eighteen days of battle, many of which were of the most violent sort, and of unsurpassed speed, considering the hostile resistance, demolitions, weather, rivers, mountains and other natural obstacles encountered. An American and French "Blitz" composed of air power, armor, artillery and mobile infantry had, in a breathtaking two and one-half weeks, overrun the National Redoubt and had sliced through its very heart. Any last hope of the National Socialists had vanished. Two days later, the entire German war machine surrendered unconditionally to SHAEF at Rheims.

During the war in Europe, I had the heavy responsibility of sending into action the gallant sons of America, knowing full well that many would not come back alive. That is a commander's responsibility in a time of impelling need to defeat a menacing enemy. I did everything in my power to insure a sound plan of action and to implement this plan with the necessary troops and matériel to keep our losses at a minimum. Throughout this campaign the welfare and best interests of our men were always close to the hearts of their commanders of every grade.

General of the Army Dwight D. Eisenhower

Air Evacuation *of* Wounded

Major General Norman T. Kirk, *The Surgeon General*

AIR evacuation of wounded, permitting prompt surgery, along with the administering of penicillin, the sulfas and blood plasma, has been one of the outstanding contributions of this war in the care of the sick and wounded. No accurate figures can be compiled for the number of lives saved in the various European theaters of operations because of air evacuation, but it is an impressive number. This speedier link in the chain of evacuation was of far greater importance in the war against Japan, both because of the distances involved and the nature of the terrain over which much of the fighting took place.

Commenting on this phase of the subject, General Brehon Somervell, Commanding General, Army Service Forces, said: "To Americans accustomed to the fine port facilities, incomparable railroad systems, and the adequate network of roads in the United States, it is difficult to conceive the lack of such facilities in India, Burma and in the hinterland of China. To reach China . . . , supplies for our troops in that area (had to) be sent on an ocean voyage of 12,500 miles, requiring 43 days, to (the) ports of India. From there they (were) transported by railroad or by river to the wild north-eastern province of Assam. The distance by rail from Calcutta is 800 miles and by river 1,200 miles."

General Somervell was talking about

the difficulties of getting supplies to our troops in these far-flung fighting areas. Obviously the same problems confronted the Army in its efforts to get the sick and wounded back through the chain of evacuation to proper medical and surgical care.

For example, the problem of getting disabled soldiers back from Burma fighting areas was an almost insurmountable one without the help of the plane. In the early days of the war, litter bearers would fight their way through heavy jungle country for days and sometimes weeks before they could complete the task of getting the wounded to medical aid. Later in the war, at small clearings made in the jungle, the sick and wounded were loaded into gliders which in turn were pulled into the air by a twin-engined tug plane and flown to a hospital a hundred miles away in less than an hour. To get the disabled troops over monsoon-ruined jungle roads usually required days while the same trip by air was only a matter of minutes. When the fighting was going on in Guam and Saipan, evacuees were brought back to Tripler and North Sector General Hospitals in Honolulu in from two to three days. The same trip by boat required two weeks or more.

Early care is of the greatest importance in both surgery and medicine and it is highly essential that skilled



Jeep ambulances wait to load wounded into C-47. (U.S. AAF photo.)

specialists start their work at the earliest possible moment. The Army's record of saving about ninety-six of every 100 wounded men who reach Army Hospitals alive is largely due to the fact that skilled surgeons were able to administer the proper care at an early stage in the chain of evacuation. Early attention for those who are sick is also an important factor in the Army's disease rate of less than one death per thousand men per year.

It is quite apparent that there were not enough specialists in the Army to bring the highly skilled doctors to the thousands of sick and wounded on the battlefield, but the chain of evacuation that was perfected to a high point of efficiency in all theaters of operations performed a good job of moving the wounded to the various stations where they received the needed attention.

The chain of evacuation as it was known in the European Theater was considerably different from that employed in the combat areas where we were fighting the Japs. Bringing the wounded through battalion aid stations, collecting and clearing stations, evacuation hospital, and then to a general hospital, if necessary, was the general conception of the chain of evacuation in Europe. Of course modifications are always made to meet the local situation, and in the case of the Japanese war there were decided differences and the need for constant improvising to provide the best possible care. The man who was picked up in a glider from a jungle air-strip was taken directly to a hospital where he got definitive care. In every case where air-evacuation was possible the patient got treatment that much quicker.



(U.S. AAF photo.)

I stress again the importance of administering prompt as well as skilled care. Injuries to the spinal cord which formerly left a man almost completely disabled can be given neurosurgical care with considerable success if the patient gets to the surgeon soon enough.

In the case of surgery the time element is always of prime importance. It often means the difference between the loss of an arm or leg or even can be a matter of life itself.

In the field of neuropsychiatry it is also equally urgent that the man suffering from combat exhaustion, or what we called shell shock in World War I, be given proper attention at the earliest stage. The great majority of these cases

were returned to duty within a matter of a week or two because they were given the right kind of care at the earliest moment.

The same rule applies with equal force from the standpoint of medicine. By giving prompt care to those who become sick in combat, it was much easier to administer successful treatment and also help prevent the spread of disease.

All of the foregoing simply points up the reason why air evacuation proved one of the most important developments in this war. There has been so much publicity given to the work done by the big evacuation planes, such as the C-47 and the C-54 that I think everyone is fairly familiar with their part in this



L-5s were used on small landing strips. (Signal Corps photo.)

program. What the small airplane, or "grasshoppers," contributed to this modern development of war medicine is not however, so generally known. During 1943 and 1944 in what was then the China-Burma-India Theater, the Army began using these small liaison planes on a big scale. They flew innumerable sorties to small improvised strips in the jungle not only to evacuate the wounded, which in many cases would have been otherwise impossible, but also to provide food, ammunition and medical supplies. On Luzon the L-5 was used to considerable advantage. This model will carry one litter or one sitting patient in comfort. The Air Forces offered the services of the L-5 squadrons for evacuation and supply purposes as a part of the Army medical service.

All ground organizations and operations were provided and controlled by the Army Medical Department. A strip could usually be cleared by a road grader or bulldozer in a few hours. They were approximately 1,000 feet long and about seventy-five feet wide. When strips were built at the hospitals or clearing stations, taxiways were constructed to the receiving and evacuation wards to eliminate the need for transferring patients to ambulances.

Evacuation of the sick and wounded by small planes was primarily from the division clearing and collecting companies to field and evacuation hospitals, and for carrying emergency patients in any area. The maximum efficiency of these small planes has been over distances of not more than thirty miles. Six to ten patients



(Signal Corps photo.)

a day can be evacuated by these planes. When longer distances and larger numbers of patients were involved the use of transport planes proved more satisfactory.

A detailed daily report system by telephone and radio was set up to inform medical group headquarters of the following: (1) Estimated number of planes needed at clearing and collecting company based on known and anticipated casualties; (2) Number of patients to be evacuated from each hospital in the area, classified as to whether "sitter" or "litter" for further local hospitalization or off-the-island evacuation; (3) Time the planes were desired; (4) Bed status of hospitals in the area; (5) Emergency or

unusual needs, including supply; (6) Local problems pertaining to evacuation.

Medical group headquarters compiled and consolidated all these reports in their areas and from them a schedule of evacuation was prepared for the entire army area and passed to the air commando group for confirmation. A reservoir of planes was always maintained for emergency use. Requests made by radio or telephone to battalion or medical group headquarters or relayed by pilots almost invariably were given immediate consideration.

An example of the success of this air-ambulance shuttle system is a monthly report taken from the evacuation opera-



Transfusion aboard a hospital plane.
(U.S. AAF photo.)

tions of the Luzon Campaign. There were twenty to thirty planes operated daily over a network of forty strips to evacuate more than 3,000 casualties efficiently, rapidly and in comfort. There was not a single serious accident.

This system was set up on a basis of flexible operation so that seventy-five or more planes could have been provided to handle an equally greater number of patients.

From the above it can be seen that the small plane occupied an important role in the evacuation of the disabled in the battle against the Japs. This system permitted the rapid removal of casualties from forward combat areas to field and evacuation hospitals, and was particularly advantageous in difficult terrain where poor roads and tactical hazards presented serious obstacles.

The role that was played by the airplane in the moving of the nation's disabled troops is reflected in figures released by the War Department. Transport aircraft evacuated more than 1,000,000 sick and wounded patients of the American and Allied forces in all theaters since the fall of 1942.

In the last four months of 1942 there were about 18,000 transported by air to points of hospitalization. In 1943 there were 155,000 and in 1944 this figure jumped to about 646,000.

It is interesting to note that almost 100 percent of the casualties evacuated from east of the Rhine in the final phases of the European War were carried by aircraft. More than 300,000 patients were evacuated in the European Theater between D-day and VE-day. The high number evacuated across the Rhine was because of the lack of bridges, roads and rail transport.

Experiences in the ETO showed that air evacuation was by far the best method in following rapidly moving armies. Air evacuation units also assisted ground armies in moving their hospitals forward. As many as 100 airplanes a day were used for this purpose.

Lieutenant General Sir Alexander Hood, the Surgeon General of the British Army, wrote me a letter in praise of the medical service of the 82d and 101st Airborne Divisions. General Hood also quoted from a report made to him by the Deputy Director of the Medical Services of the British Airborne Forces. It read: "The opportunity of observing the work of the medical services of the U.S. Airborne Divisions was of great interest. I was very favorably impressed by the high professional and administrative standard which was attained, and above all, by the loyal cooperation which I received at all times from the surgeons of the two divisions. There was a complete absence of 'belly-aching' and an atmosphere of determina-

tion to overcome all difficulties and to ensure that everything that medical skill and intelligent forethought could provide was available for casualties."

From what I have said I do not want to give the impression that all evacuation of wounded was by air. That would have been physically impossible with the existing facilities. However air evacuation was used near the battle fronts and where speed was most essential.

There is one phase of this air evacuation subject I have not covered. It is of an intangible nature. I can give you no figures. Yet it is recognized by Army authorities as a very important by-product of this system of transporting the disabled by air. That is the matter of morale.

Unless you have been thousands of miles away from home under circumstances such as confront troops in battle you will never know how comforting the thought is that if you should be wounded air-transport could take you home in a matter of a few days. Also important to a man fighting in the jungle or isolated areas is the thought that if an emergency

develops, Army planes can pick him up from improvised air strips and get him to the best possible medical care. It is realized that morale is a big factor in winning battles and it has been proved that this air evacuation system played an important part in the morale of troops on the fighting fronts.

In seeking to bring about improvements that would enable us to attain ever better records in handling disabled soldiers, the leading medical, surgical and disease control commanding officers of all theaters of operations held a meeting in 1945 at the Surgeon General's Office. There was an interchange of ideas as to which planes had worked best, where improvements could be adopted and what new policies should be established.

Air evacuation stands in the forefront of modern advances which were developed in World War II and the American public can rest assured that the Army Medical Department will do everything in its power to utilize this to the fullest possible extent so that we can give the American soldiers even better care than they have been getting up to now.

There can be no doubt that the greed and the mistakes of the war-making nations as well as the heroic stands of the British and Soviet peoples saved the United States a war on her own soil. The crisis had come and passed at Stalingrad and El Alamein before this Nation was able to gather sufficient resources to participate in the fight in a determining manner. Had the U.S.S.R. and the British Army of the Nile been defeated in 1942, as they well might if the Germans, Japanese, and Italians had better coordinated their plans and resources and successive operations, we should have stood today in the western hemisphere confronted by enemies who controlled a greater part of the world.

Our close approach to that terrifying situation should have a sobering influence on Americans for generations to come. Yet, this is only a prelude of what can be expected so long as there are nations on earth capable of waging total war.

General of the Army George C. Marshall

Naval Organization

— The Shore Establishment

Rear Admiral Miles R. Browning, *United States Navy (Retired)*
Former Director, Naval Section, Command and Staff College

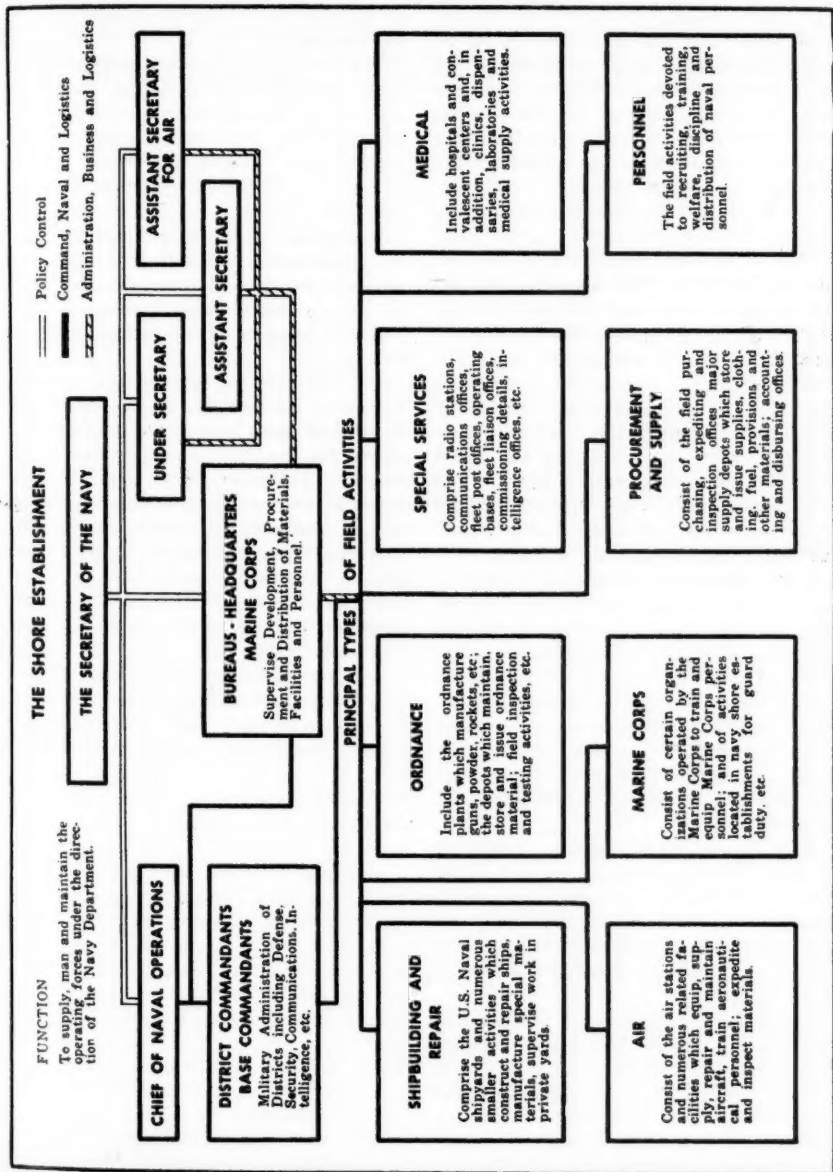
This is the second in a series of three articles by Admiral Browning and supplements an article on the same subject which appeared in the December issue of the Military Review. The third and final article will be published in an early issue.—THE EDITOR.

THE United States Naval Establishment comprises three distinct major components in its post-war make-up. These are: (1) the *Navy Department*, which is the central directing and controlling agency for the entire establishment; (2) the *Operating Forces*, which are the combatant components for the service and support of which the rest of the Navy exists; and (3) the *Shore Establishment*, which does the physical work in support of the Operating Forces. The great majority of the individual installations and activities which make up the Shore Establishment are situated within the continental limits of the United States. Even at the peak of World War II, when outlying support functions and demands were more numerous and extensive than ever before, some 6300 individual activities, comprising seven-eighths of the Shore Establishment, were located here on the mainland.

The geography of the continental United States imposes upon its naval operating forces the necessity for the constant maintenance of readiness in both of the

two great oceans which bound it on the east and west respectively, as well as in the Gulf of Mexico to the south. It is an inescapable corollary of this requirement that the functions and activities of the Shore Establishment must be similarly distributed to facilitate service and support to the Operating Forces in these theaters. In effect, there must be approximately duplicate installations providing such support and service to *Atlantic* and *Gulf* operating forces on the one hand and to *Pacific* operating forces on the other. Most, but by no means all, of these installations are located on, or immediately proximate to, the coastal ports of the country. In the cases of personnel activities, supply and procurement centers, air ordnance installations and certain special services, however, a considerable number are distributed inland.

The entire Shore Establishment is supervised directly by the Navy Department. This control and direction is accomplished through the three channels as follows: first, *general administrative* supervision is performed by the Secretary of the Navy, who promulgates the policies and procedures which govern civilian personnel involved, controls the broad aspects of procurement and production, and furnishes the guides for sound over-all industrial management; second, *technical* supervision and *direct management* control are furnished, within the limits of their respective responsibilities, by the



technical bureaus of the Navy Department, who hold the purse strings on all funds for upkeep and operation of the shore activities; third, *military command* and the coordination of logistic services to the Fleets and Sea Frontiers, (i.e., the Operating Forces), are exercised by the Chief of Naval Operations.

The Shore Establishment prosecutes its primary mission of logistic service and support of the Operating Forces through the medium of its *field activities* and installations. These may be conveniently and profitably grouped under eight principal classifications as follows:

1. *Shipbuilding and repair*, comprising the naval shipyards, a large number of smaller ship construction and/or repair facilities, parts factories, and the naval inspectorates at private shipyards and construction plants. All shipbuilding and repair activities are under the technical supervision of the Bureau of Ships.

2. *Air activities*, comprising Naval air Stations and related installations engaged in or designed for construction, equipment, supply, repair and maintenance of aircraft, or for the training of aeronautical personnel, and the naval inspectorates at the plants of private manufacturers of aircraft, aircraft engines, instruments, equipment and parts. Bureau of Aeronautics exercises technical supervision over all such.

3. *Ordnance* establishments, consisting of gun, powder, rocket, mine and depth charge factories, ordnance assembly plants, ammunition depots, arsenals, proving grounds, field inspectorates, etc. These are under technical control of the Bureau of Ordnance.

4. *Supply*, comprising procurement agencies for general stores and supplies including fuel and lubricating oil, provisions, clothing, etc.; supply depots and storage and issue facilities; accounting, disbursing and finance offices; inspectorates at private establishments. The Bureau

of Supplies and Accounts exercises technical control.

5. *Personnel*, comprising recruiting stations and offices in all major population centers in the country, receiving ships and stations, personnel depots, training stations and schools, and naval prisons. The Bureau of Naval Personnel exercises technical control.

6. *Medical*, comprising hospitals, clinics, laboratories, dispensaries, convalescent and rehabilitation centers, and medical supply depots. The Bureau of Medicine and Surgery exercises technical control.

7. *United States Marine Corps* establishments, comprising, on the one hand, those field installations and facilities required for the training, supply and maintenance of Marine Corps personnel and material, and on the other hand, activities located in the various naval shore establishments such as shipyards, bases and depots, for the performance of police, guard and security duties. The Headquarters, U.S. Marine Corps, exercises technical control.

8. *Special Services*, comprising various types of specialized installations and activities such as radio stations, intelligence offices, fleet postal offices, commissioning details, and a large number of other miscellaneous functions. The appropriate Bureau exercises technical control.

As the reader knows, the United States Coast Guard, which operates under the control of the Treasury Department in time of peace, becomes, by Presidential order, an integral part of the Navy in time of war. The Coast Guard operates approximately 1600 activities under its own Commandant and through its own district offices, in a similar manner to the Marine Corps. The functions of these field activities, which include the Coast Guard Academy, comprise personnel, supply, maintenance and repair, and the establishment, maintenance and opera-

tion of light houses, life saving stations, light ships, aids to navigation such as buoys and fog signals, port security, coastal police, and similar duties. In time of war, the Coast Guard shore establishment drops into a position within the U.S. Naval Establishment exactly similar to that occupied by the Marine Corps field activities.

It is apparent from the above outline that the technical supervision and management control of the various field activities of the Shore Establishment stem directly from the pertinent technical bureau in the Navy Department. In the purview of military command and general administrative supervision, however, it has been found necessary to provide for decentralization of the authority wielded by the Chief of Naval Operations and the Secretary of the Navy, respectively. This decentralization has been accomplished by means of geographical subdivision of the entire United States and outlying possessions into Naval Districts. There are a total of fifteen of these Naval Districts, eleven of them lying within the continental limits and the other four being located in outlying territories. They are listed below, together with the location of the district headquarters in each case.

First Naval District	—Boston, Mass.
Third Naval District	—New York City, N. Y.
Fourth Naval District	—Philadelphia, Pa.
Fifth Naval District	—Norfolk, Va.
Sixth Naval District	—Charleston, S. C.
Seventh Naval District	—Miami, Fla.
Eighth Naval District	—New Orleans, La.
Ninth Naval District	—Great Lakes, Ill.
Tenth Naval District	—Puerto Rico
Eleventh Naval District	—San Diego, Calif.
Twelfth Naval District	—San Francisco, Calif.
Thirteenth Naval District	—Seattle, Wash.
Fourteenth Naval District	—Pearl Harbor, T. H.
Fifteenth Naval District	—Balboa, Panama, C. Z.
Seventeenth Naval District	—Kodiak, Alaska

As a matter of interest, the blank numbers Two and Sixteen are accounted for by the facts that the old Second District, with headquarters at Newport, R.I., was consolidated with the First District many years ago, and the Sixteenth District, whose headquarters were formerly located

at Manila, was abolished coincident with the granting of Philippine independence.

Each Naval District is commanded by a Commandant, through whom the Chief of Naval Operations exercises military command and the Secretary of the Navy exercises administrative control over all Shore Establishment activities within the geographical limits of that district. The command and administrative control so performed do not in any way infringe upon the technical and management prerogatives of the Bureaus. The Districts may be considered as "branch offices" for the Shore Establishment. In addition to their primary functions as military commandants and coordinators for their districts, the District Commandants are charged with contact with the public through direct meeting, press relations, etc. They also gather intelligence and function as liaison coordinators in all military matters with the related echelon commanders of the U.S. Army and the Coast Guard in the vicinity.

The organization of *Bases* within each district occupies an extremely important place in the functioning of the Naval District organization of the Shore Establishment. A "base" is a group of Shore Establishment activities coordinated under one Base Commandant. The prime responsibility of the base is service and support to certain specified fleet units. Thus, each ship and aircraft unit of the fleet has a designated "home" base; i.e., that group of activities situated in a given locality whose operation is pointed primarily to the end of support and service of the designated fleet units. The base integrates the functioning of all its components in the furtherance of that mission. The following major "Naval Bases" have been established. They include the "Naval Shipyards" and other activities located in their vicinity.

Portsmouth, N. H.
Boston, Mass.

Newport, R. I.
Brooklyn, N. Y.
Philadelphia, Pa.
Norfolk, Va.
Charleston, S. C.
Mare Island, Calif.
Bremerton, Wash.
Pearl Harbor, T. H.

In similar manner, the operational (as distinct from training) air fields of each Naval District are grouped together into the "Naval Air Bases" of that District; the training air fields are grouped together into a command designated "Naval Air Training Bases" of the District; and the Marine Corps air fields are consolidated as the "Marine Corps Air Bases" of the District. Under the Chief of Naval Operations, the District Commandant exercises his military command and his administrative control for coordination through the Commandant, Naval Bases, the Commander, Naval Air Bases, the Commander, Naval Air Training Bases, or the Commander, Marine Corps Air Bases, as the case may be. In the case of the Naval Air Training Bases command, however, the authority of the Naval District Commandant is limited to that re-

quired to insure effective coordination of the Training Bases into the military defense of the district.

Paralleling the place they occupy in the chain of command and administrative control over the installations of the Shore Establishment, the Commandants, Naval Bases and the Commanders, Naval Air, Naval Air Training, and Marine Corps Air Bases are utilized by the pertinent technical Bureaus of the Navy Department to insure smooth integration, in a technical management sense, of all activities of a like nature embraced within their respective commands.

From the foregoing discussion, together with reference to the chart on page 35, we may perceive clearly that the Shore Establishment has for its main aim of existence to provide the media for assembling and delivering the materials and the services required to maintain the Operating Forces in a manned, equipped, ready for combat condition in order, in peacetime, to guard against the eventuality of an emergency which may lead to war, and, in wartime, to insure maximum combat effectiveness.

Each commander is enjoined to hold uppermost in his mind the thesis that regardless of the soundness of any organization which may be created, cooperation will not be achieved unless the *will* to cooperate is present.

— General Carl Spaatz

Resupply *in an* Airborne Division

Lieutenant Colonel Carl W. Kohls, *Quartermaster Corps*
Instructor, Command and Staff College

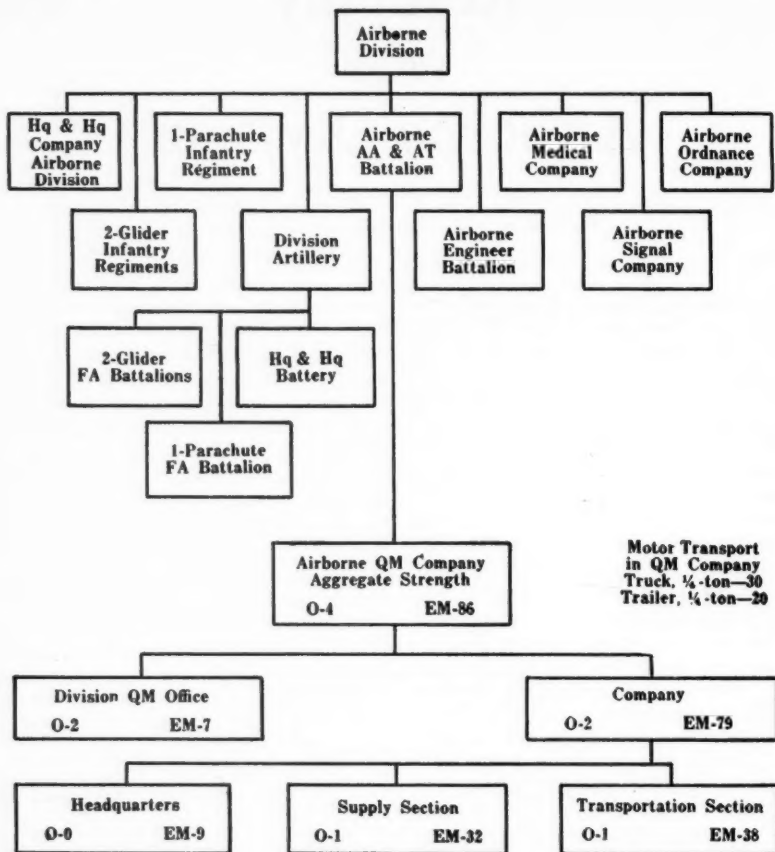
IN December 1944, the 101st Airborne Division was beset on all sides by enemy forces. Here was a situation which always had been visualized as typically airborne. The entire division was fighting behind the enemy lines and was completely surrounded. How was it to be resupplied with the vital and necessary supplies needed to sustain itself? Of course the answer was resupply by air, and history shows us that the resupply missions flown by the Troop Carrier Command were entirely successful and that the supplies delivered by air enabled the division to carry out its mission of holding Bastogne against very strong enemy forces. Here we had a complete airborne division that, with the exception of forty-three glider loads, was supplied entirely by air-dropped supplies. How did the original concept of resupply procedures agree with the one in use at the time the 101st Airborne Division was resupplied in December 1944? It will be necessary to go back to 1942, when the first two airborne divisions were activated, to see what the thoughts then prevailing on resupply procedures were.

On 16 August 1942, the 82d and 101st Airborne Divisions were activated, practically all of the personnel for the two new divisions being obtained by an even split of the 82d Infantry Division, which had been in training at Camp Claiborne, Louisiana. Included in the T/O&E was a

quartermaster company of four officers and eighty-six enlisted men. It was around this company that all resupply planning originally was done.

Because it was considered that an airborne division would always be employed to operate behind the enemy's lines, all thoughts and training were directed towards resupply with the supplies coming into an airhead established within the perimeter of the airborne division. It was considered that the first resupply would be either by parachute or glider and that later when a landing strip had been constructed, air landed resupplies would be available. It was known that as long as the airborne division was at a rear base, normal ground methods would of course be employed in supplying the divisions' needs for all types of supply. It must be remembered that plans and procedures to be used in combat had to be evolved during the training phase. Because it was believed that the airborne division would be relieved the moment ground forces had made contact with it, it was thought that the normal methods of supply used by the ground forces would not be used by the airborne division.

The airborne division had the quartermaster company available for resupply work. The other service organizations within the division were made up of specialists in their fields, and were not considered available for resupply work.

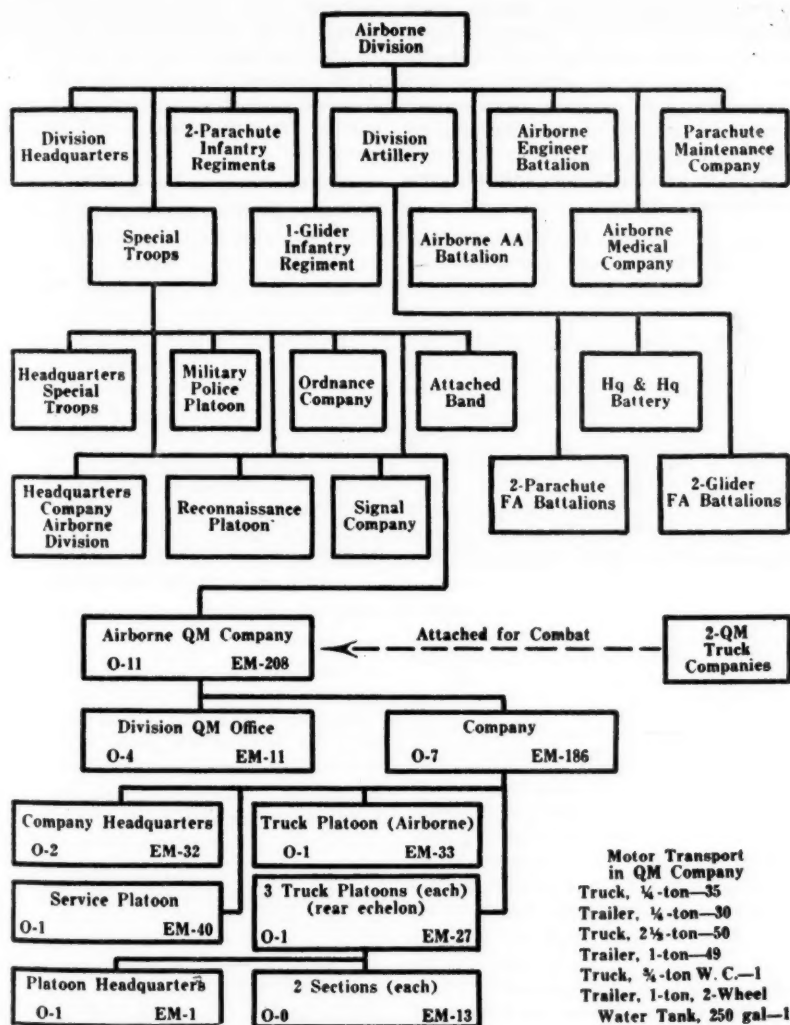


Organization of Airborne Division on T/O&E dated 5 Sept 1942
showing breakdown of Quartermaster Company.

The quartermaster company had a supply section of thirty-three individuals and a transportation section of thirty-nine individuals which operated the thirty, ¼-ton trucks and twenty, ¼-ton trailers in the company. It was planned that this company would have to perform not only the pickup and delivery of all resupplies in

the division airhead, but also would have to package, load, and deliver, via air transport furnished by the Troop Carrier Command, all of the resupplies from rear bases.

Although previous experience had shown parachute battalions and régiments that they could resupply themselves by parachute, using the organic parachute mainte-



Organization of Airborne Division on T/O&E dated 16 Dec 1944 as changed by C-1 dated 31 Aug 1945 showing breakdown of Quartermaster Company.

nance sections of the service company, no data was available to show that an entire airborne division could resupply itself using the organic personnel within the division. Until the troop carrier planes were made available in numbers large enough to allow for practical tests, plans for resupplying the airborne division continued to be built around the organic airborne quartermaster company.

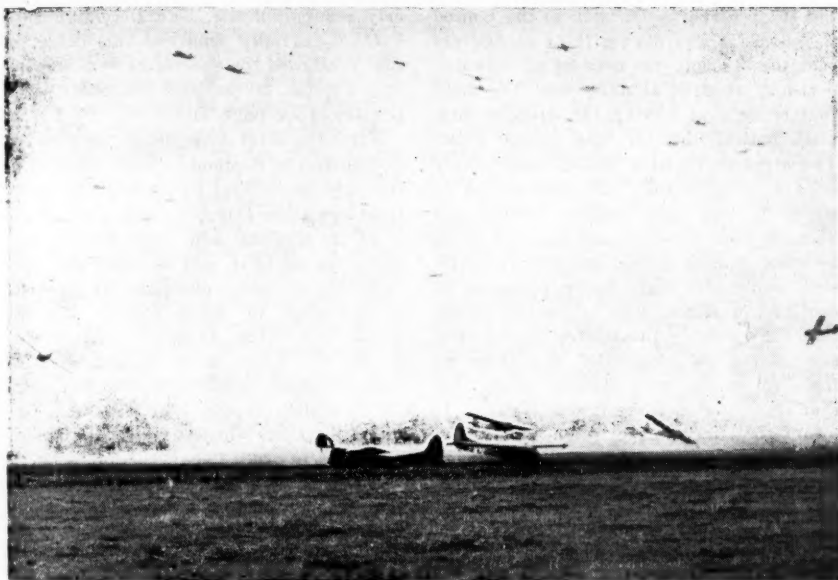
It was planned that this small company would have both a rear and a forward echelon. The rear echelon would be responsible for the packaging, loading and delivery of all resupplies, and the forward echelon would pick up the supplies and make them available to the units of the division. Even though no practical tests had been made in parachute delivery of supplies to the entire division, it was believed that the quartermaster company was entirely too small an organization to carry out the enormous task laid out for it. A few months after activation it was evident that a larger quartermaster company was required, if it was to perform the task required of it in combat. It was not until December 1944 that the strength of the quartermaster company was increased to a size which would allow it to perform its mission adequately, but by this time the original mission had changed considerably.

Prior to the first maneuvers in South Carolina in May 1943, the 101st Airborne Division went through a series of field exercises in which it was always assumed that the necessary supplies had been delivered to an airfield, which was included in the perimeter set up by the division after landing. From this airhead the simulated supplies were picked up and transported to the division supply points by the quartermaster personnel. It soon became evident that the quartermaster company, with the meager transportation available to it, could not transport the large ton-

nages required by the division from the airhead to the supply points, unless the supply points remained more or less static in the near vicinity of the airhead. This work required the use of the entire quartermaster company augmented by a small section from the division ordnance company.

In May, June, and July 1943, the 101st Airborne Division participated in a small South Carolina Airborne maneuver, and in the Second Army maneuvers centering around Springfield, Tennessee. Here was the first opportunity to test the theories on resupply developed during the training phase. Prior to the maneuvers, a newly developed radar device had been demonstrated to both airborne divisions. This was the Eureka-Rebecca homing device which enabled an airplane to "home" directly to a selected spot. At the time of the demonstration it was proved highly successful, and a great future was expected of the device. Later on, in combat, it was to prove its worth even more.

In the South Carolina maneuvers, it was planned to supply by air both rations and simulated ammunition. It was planned to utilize the greater portion of the quartermaster company at the established airhead to retrieve all delivered supplies, and to set up division supply points. The packaging, loading, and delivery of the supplies by air was to be performed by rear base personnel working with the smaller portion of the quartermaster company as a nucleus. Two important lessons were learned for this maneuver. First of all it was definitely proved that the large amount of work necessary in packaging, loading and delivery of aerial supply could not be performed by division personnel without impairing the efficiency of the various units detaching personnel for this work. This resulted in training a quartermaster depot company to perform the packaging, loading and delivery



Gliders loaded with American men and equipment are landed in Holland.
(Signal Corps photo.)

of supply bundles for air drop and also the loading of resupply gliders. The 490th Quartermaster Depot Company started such training under the Airborne Command and later worked with the 101st Airborne Division on the Tennessee maneuvers.

The second lesson learned was that supplies delivered by air could be put into the hands of using troops even though the quartermaster company was not available to perform this work. The weather made it impossible to have all units of the division transported to the South Carolina maneuver airhead. The quartermaster company was one of the units which did not enter the airhead area. By using captured "Reds" and having the various units bring their own trans-

portation to the glider landing field, all units were able to draw from airhead and issue to subordinate units rations necessary for consumption by the troops. The flight of transports carrying the simulated ammunition in packaged bundles was never able to find the proper drop zone, so consequently it was not necessary to improvise means to pick up any dropped ammunition. Later, and during combat at Bastogne, Belgium, the 101st Airborne Division was to be faced with a similar problem in that it did not have either the quartermaster or the ordnance companies available, and yet it succeeded in successfully retrieving all air-dropped supplies for four days' deliveries.

The Tennessee maneuvers preceded by less than two months, the movement of

the 101st Airborne Division to the United Kingdom. It was during these maneuvers that the division was used as an infantry division, which it actually was. The original concept of having the division supplied entirely by air was proved false. The airborne division would have to rely on air resupply only for that period in which it was still isolated behind the enemy's lines. After contact had been made by other ground forces, the airborne division would still have to be prepared to continue in action. This, of course, meant that the resupply procedures of the division would be identically the same as those for an infantry division except for that short period while it was isolated. It meant that the transportation allowed the division, especially the quartermaster company, which had no 2½-ton trucks, was totally inadequate. Additional truck companies had to be attached to the division in order that the division could prop-

erly resupply itself. The December 1944 T/O&E partially remedied this defect in that it allowed the quartermaster company fifty 2½-ton trucks and forty-nine 1-ton trailers. (See page 41.)

After the 101st Airborne Division moved to England in September 1943, training in resupply procedures continued. The 490th Quartermaster Depot Company which arrived in England after the division did, was attached to it, and together they carried out as many exercises as possible. The number of troop carrier aircraft available for this type of training was limited due to the more urgent need for them as troop carriers in field exercises. Large scale resupply exercises were executed, however, when the aircraft became available. In order to carry out these large scale exercises a huge quantity of simulated supply packages was assembled. A new problem arose which at the time seemed extremely disheartening. When as



C-47 planes drop supplies on division area in Germany.
(Signal Corps photo.)

many as 300 aircraft were used to drop resupplies, the dispersion was so great (at one time covering an area several miles long), that it took the quartermaster company a good part of the day to retrieve all dropped bundles. It was known that if the hundreds of bundles were to be dropped into a smaller area, they would be recovered in a much shorter time. At no time before the Normandy invasion was the dispersion small enough to allow for a rapid recovery of the dropped bundles. The extensive training tests were, however, to pay big dividends, for later in combat the Troop Carrier Command did a superior job of dropping the bundles in a very small area.

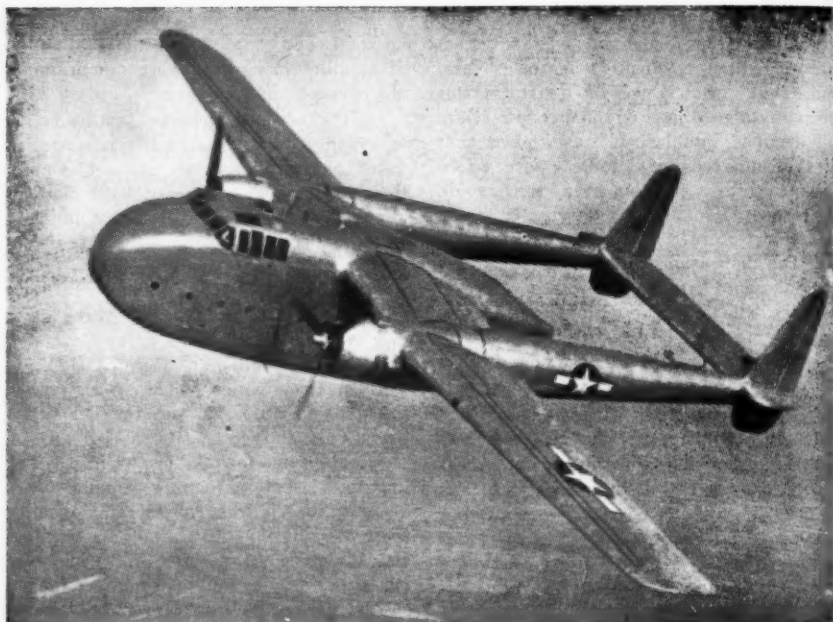
In the early part of 1944 the Air Forces became responsible for the receipt, packaging, loading, and delivery of all supplies by air. The 490th Quartermaster Depot Company was relieved from attachment to the division and was assigned to the Ninth Air Force. The mission of the division in so far as aerial resupply was concerned became one of the receiving only. When the division was fighting in the line all division services operated in the same manner as did those of an infantry division. The division quartermaster company was responsible for the recovering of all air-delivered supplies, be it by parachute or glider.

In order that an airborne division could continue to operate as an infantry division once it had been committed to action, certain attachments were found necessary. Among these attachments were two quartermaster truck companies. In the planning phase for Operation "Overlord," it was deemed necessary to have two truck companies attached to the division, which would allow the division supply services to carry 240 tons of supplies, these supplies becoming available to the division immediately after contact had been made with the division by other ground forces. In the Normandy operation

these supply vehicles became available on D+1, and coupled with the availability of supplies in corps supply dumps, made air resupply unnecessary.

In the second airborne operation, in which the 101st Airborne Division participated, the "Holland" or "Market" Operation, full use was made of both methods of resupply. The two truck companies were loaded with supplies on the continent and joined the division on D+1. Air resupply had been planned with automatic deliveries for the first three days, and "on call" deliveries after the third day. Generally all plans were carried out. The truck companies, or "land tail," joined the division on D+1 and the aerial deliveries of supplies were carried out on schedule except for one day when weather interfered. The parachute supplies were dropped in an area considerably smaller than had been accomplished in training. The glider loads of supplies accompanying the air-follow-up troops were landed on the proper landing zone. The division quartermaster company, with the assistance of local labor, was able to retrieve a large share of the air-dropped supplies, and practically all of the glider-loaded supplies. This operation showed that to have a "land tail" loaded with supplies was sound. It proved beyond doubt that glider-loaded resupply is extremely effective, but is dependent on the availability of gliders for supply or resupply purposes. Some doubt still existed on the efficiency of air-dropped supplies, in that too large a percentage of the air-dropped resupply still was too greatly dispersed, preventing the recovery of any bundles landing outside the perimeter of the division.

The third operation participated in by the division, finally proved that airborne resupply both glider and parachute, was sound and that when the air-dropped resupply was landed within a small drop zone, practically all of the bundles con-



C-82 in flight.

taining supplies could be retrieved. It also proved that large tonnages of delivered supplies could be retrieved and put to use rapidly, even though the organization charged with the mission of recovering all air-dropped supplies, the division quartermaster company, was not available. During this operation, a total of 770 tons of supplies was delivered in four days, and was successfully picked up and put to use. In addition sixty-three glider loads of supplies were flown in and unloaded. The one sad feature of this resupply mission was that out of fifty gliders, which started out on 27 December, loaded with artillery ammunition only thirty-two landed on the Bastogne landing zone, the remaining twelve having been lost on the way.

The combat experience of the 101st Air-

borne Division proved conclusively that aerial resupply procedures were sound and that it was entirely feasible to deliver large tonnages of supplies to the division daily. In the Bastogne operation the air-dropped supplies were all dropped in a small pattern, which showed that the troop carriers could drop large tonnages consisting of hundreds of bundles into a very small area.

There remained only one bad feature to aerial resupply. The C-47 airplane, even though it had a payload of 8,000 pounds, was restricted to carrying only ten bundles of supplies if a small drop pattern was to result. Six of the bundles were carried in the racks at the bottom of the aircraft from which they could be dropped simultaneously. The remaining four were ejected from the door by the air resupply

squadron personnel. In order to deliver the 300 tons required by the division a total of 300 aircraft was required. If the C-47 could have carried the maximum payload a total of only seventy-five aircraft would have been required. Development of the roller conveyor system for use in the C-47 had not progressed to the extent necessary to allow it to be used for the combat resupply missions to the 101st Airborne Division. When the roller conveyor system had been perfected to the degree necessary to allow it to be used in present and future aircraft having larger payloads, the improved discharge system will then allow for the required 300 tons to be delivered by a smaller number of aircraft. The C-82 which has a payload of 15,000 pounds for short ranges would allow the number of required aircraft to be reduced to forty. The XC-97 airplane having a payload of 42,000 pounds at a range of 770 miles, and 17,000 pounds at a range of 3,500 miles, using a rapid ejecting system, would allow for extremely large tonnages to be carried for short distances by very few aircraft, and would allow less than forty airplanes to carry the daily resupply requirements for an airborne division for ranges over 3,000 miles.

The glider used in the past war, the CG-4A had a payload of only slightly over 3,000 pounds. It would have taken 200 of these to carry the resupply requirements for an airborne division. Its effectiveness, however, was reduced by its cruising speed which was less than 150 miles per hour. Towed at this rate of speed the glider was a fairly remunerative target for ground antiaircraft fire. The CG-10A has

a payload of over 12,000 pounds and a cruising speed of 190 miles per hour. It would require only fifty of these gliders to furnish the daily resupply requirements of an airborne division. In addition, the gliders, flying at a greater speed, would not be as vulnerable as the CG-4A. A proposed glider which will probably be available in a few years, will have a payload of 16,000 pounds and will cruise at 180 miles per hour. It would only require thirty-seven of these large gliders to resupply an airborne division completely.

The cargo parachute used throughout the past war restricted the container weight to from 150 to 300 pounds. New developments in parachutes certainly will keep pace with the development of carrier aircraft. Parachutes capable of carrying as much as 500 to 1,000 pounds should be available, and this will reduce the number of containers considerably. A suitable roller conveyor system would certainly allow for the rapid discharge of these heavy containers. There probably are persons who might say that it is fantastic to think that thirty to forty aircraft towing an equal number of gliders could resupply an entire division a thousand miles away by parachute and glider.

Back in 1939, when World War II started, how many people would have thought it possible to sustain an entire division by air-dropped resupply as was the 101st Airborne Division at Bastogne in December 1944? With the constant development of carrier aircraft, gliders, and parachutes, it becomes entirely feasible to expect airborne forces to be resupplied by air over a thousand miles from their bases.

Education of Soldiers

in the European Theater

Lieutenant Colonel John A. Gavin, *Infantry*
Instructor, Command and Staff College

“ONE of the important lessons in the post armistice period of the last war (World War I) was that men will not willingly accept military training when the fighting is over. This was vividly brought out in the now famous Fosdick reports, to General Pershing and to the Secretary of War, on morale in the American Expeditionary Forces. In these reports, Mr. Fosdick stressed the value to morale of athletics, recreation and education as opposed to purely military training. This was a primary reason for the Army's education program in World War II.” The above, extracted from a study made by the General Board, European Theater of Operations, formulates the underlying incentive for the birth and growth of the education program in our Army during and following World War II.

One of the aims of the War Department in establishing an education program has been to provide the American soldier opportunities whereby he may become the best educated soldier in any army. This non-military education is provided on both an ‘off-duty’ and ‘duty time’ basis. It is arranged so as not to interfere with requisite military training. Subjects of both a technical and general nature are offered. A study along technical lines serves to enhance a soldier's chance for promotion in his organization and to improve his opportunities in civil life by the acquisition of additional skills. On the other hand, a study of subjects of a broad general nature results in a better rounded education

and a higher cultural level, which will make the individual a better soldier and a more useful citizen. Although the Army cannot attempt to duplicate the wide scope of a civilian education program, it can and does offer one which is representative of a cross-section of civilian education. In other words, it may well be said that the Army's effort allows a soldier to pursue studies which were interrupted by induction, or to advance his general education.

The main operating agency of non-military education is the United States Armed Forces Institute at Madison, Wisconsin. USAFI, as it is generally called, is a joint agency of the War and Navy Departments. Branches of this institute are in operation in Europe and in all major theaters. Services made available to soldiers are:

- USAFI Correspondence Courses.
- Self Teaching Courses.

- University extension correspondence courses.

- Materials for class instruction.

- Visual Aids.

- Educational information and accreditation services.

Leading civilian educators and institutions serve in an advisory capacity to USAFI. The successful use of this Agency by the field personnel for whom it was designed depends a great deal on the amount of interest and “plugging” by Commanders.

In the beginning, education in our Army grew side by side with welfare, recreation and entertainment under Special Services. Later educational activities were regrouped with the other so-called "mental" functions of information and orientation and placed under the guidance of Morale Services. The latter staff agency eventually became known as "The Information and Education (I&E) Division" at both War Department and theater levels.

The extreme importance of this program was reflected in the personal interest shown by the highest military authorities in the theater. Despite this interest, however, the program experienced difficulties in the various theaters which slowed down its progress. For example, no official allocation of personnel for educational activities was authorized prior to the issuance of War Department Circular 360, dated 5 September 1944.

A discussion of the educational program in the European Theater divides itself naturally into a combat phase and a post-war phase. While the fighting was still in progress, very little active participation by soldiers took place in the educational field. Although language classes were authorized and encouraged, the percentage of men who could be spared to attend was extremely limited due to combat requirements. The emphasis during this period was on orientation and information activities such as weekly orientation lectures, Armed Forces Radio Network, etc. This is not to say, however, that the subject of education was abandoned or slighted. On the contrary, every effort was made by Theater Headquarters to plan and prepare the post-hostilities education program.

The most notable feature of this preparation was the organization and operation of the Army Information-Education Staff School on the theater level. The purpose of this school was to train discussion

leaders. Information and Education Officers, educational instructors and educational advisors. All key Information and Education personnel attended. Upon successful completion of the course the personnel returned to their respective units. There they conducted a survey with a view towards providing additional instructor and advisory personnel, school facilities, course of instruction, and student bodies for the various types of educational activities offered. In addition, the I&E officers were counted on to "sell" non-military education to the unit commanders. Although it is believed that I&E officers of headquarters down to include the division level, experienced little difficulty in selling the educational program, it is not believed that much success was gained in smaller units (battalions and companies). The latter were either busily engaged in combat or dispersed over very wide areas on occupational duties.

As the end of hostilities in Europe approached, the basic War Department directive for the Army Education Program in Inactive Theaters was published in War Department Readjustment Regulations 1-1, 15 Feb 45. This reads in part:

"At such time as the military situation and mission of any element in theaters permit, purely military instruction will be reduced to that necessary for the execution of the mission and the maintenance of military proficiency, orientation, discipline and health. That part of the training day not required for these purposes will be devoted to a program of educational and recreational activities which will be conducted in a manner that will require the full support of the personnel during the time allotted. The purpose of the program is to assist in the maintenance of discipline and morale and be of maximum future benefit to military personnel."

With the arrival of VE-day, the post-hostilities educational program in the

European Theater went into effect. The following activities were included:

(1) Correspondence and self-teaching courses offered by the United States Armed Forces Institute.

(2) Establishment of Command (Unit) Schools on the battalion level.

(3) Program of "On the Job" Training.

(4) Establishment of Army University Study Centers (England and France) and centralized technical schools.

(5) Program for training within civilian agencies.

(6) Immediate program for the training of an estimated 20,000 key educational officers to be conducted by the Army Information-Education Staff Schools.

It is reported that the above was based on serving 2,000,000 men. For this purpose, some 5,000,000 textbooks were allocated by the War Department to the European Theater.

Before charting the progress of the education program in ETO, it might be well to point out one of the choke points that served to retard the success of this ambitious undertaking. I refer to the problem of supply. Until May 1945, educational supplies were handled in the Theater by Special Services. Inasmuch as Special Services was not on an acknowledged supply service, it had difficulty in functioning efficiently in the distribution of I&E materials. As a result, the requisitioning of textbooks, etc., for the educational program reverted to an "emergency" basis and many orders were placed direct with manufacturers. Such items were "small packaged" and consequently subject to becoming lost in the huge shipments arriving on the continent. These essential items could not easily be replaced and their loss had a direct bearing on whether or not a unit school could be operated. That fact, added to a lack of a recognized supply channel, appreciably diminished the chances of these items reaching the users.

The educational activities provided for in the program offered our soldiers a variety of subjects to select from to fit their particular background. It is of interest to note that a recent survey showed that twenty-six per cent of our soldiers in World War II had only a grammar school background whereas the percentage of American soldiers in this category in World War I was eighty per cent. Immediately following VE-day, the "Stars & Stripes" published a series of releases indicating that all the courses referred to above were available. In some instances these releases were made prior to the receipt by unit I&E officers of either the directives or supplies on which to base such courses. The reaction of soldiers was that of disappointment as demonstrated in the "B-Bag" column of "Stars and Stripes." They asked: "Where is this I&E program you advertised?—No one knows about it!" Hence another grievance was added, and corrective steps had to be taken to speed things up.

The program gradually developed. By 30 November 1945, some 180,000 officers and enlisted men were enrolled in the USAFI courses, and some 8,500 had officially completed these courses. Quotas for Army University Study Centers, centralized technical schools, and training within civilian agencies could have been filled five times over. Command (unit) schools and "on the job" training became popular. A shortage in textbooks for the more popular courses developed, as the majority of our soldiers were interested only in such courses.

Redeployment had a tremendous effect on the command school program. For example, one day a school would be operating with some 200 students and five instructors, while the next day there would be just a handful of students remaining, and possibly one instructor. This proved that command schools on the battalion level were sometimes uneconomical and

impracticable. The lesson to be learned from this is that a better organization of the command schools could be effected under divisional guidance. Separate units could be pooled in the establishment of a divisional school with each unit furnishing its proportionate share of personnel for faculty and student body alike.

These schools have now been suspended in ETO. It is planned, however, to reopen them when conditions permit. The scope of this type of school includes: literacy training, upper elementary school subjects, standard high school subjects, vocational instruction and junior college courses.

Two Army University Study Centers were established—one in Shrivenham, England, and the other in Biarritz, France. They provided educational opportunities in sciences, liberal arts and pre-professional fields. These centers were designed for soldiers with needs beyond the level of the Command Schools. Although they enjoyed wide popularity for several months, rapid redeployment and demobilization have caused them to be closed.

Technical schools were established in or near field army technical installations where specialized equipment and excellent instructors were available. They offered a variety of vocational courses not available in the unit schools. A centralized school of this nature had been established in Wharton, England, but it too has been closed for lack of students.

While the program was at its peak more than 14,000 military personnel participated in the "Training Within Civilian Agencies." Some 100 European civilian schools and other agencies provided this instruction. In the beginning, this training was conducted on a 'duty time' basis. At the present time, however, it has been reduced to a small scale on a 'furlough-leave' basis.

It is difficult to measure the amount of

success attained in the education program as conducted in the European Theater. Reports show that while only ten per cent of the soldiers in the theater participated, the men who were able to take advantage of the facilities offered were very enthusiastic concerning the results obtained. Credit for attendance and completion of courses unquestionably assisted many thousands of soldiers in securing credits in high schools, colleges and universities upon their return to civilian schooling in the United States.

Hindsight is always the "doctor" to remedial action in any new field. As pointed out, there have been many obstacles in the progress of this program. It is believed that the factors which served to retard its success in the European Theater of Operations were:

(1) Redeployment of troops which interfered with well thought out educational programs as they were just beginning.

(2) Lack of timely advertising for the Army Education Program. Commanders were more favorably impressed by the more lucrative and self-advertised fields of movies, radios and current publications in the theater.

Today the entire education effort is controlled by the Director of Public Information in the War Department. The Army Information School, Carlisle Barracks, Pa., has been established for the purpose of training Information-Education personnel.

It has been suggested that the following would materially aid this program.

(1) USAFI be given as wide publicity as possible.

(2) All critical information concerning educational opportunities be submitted through command channels.

(3) A recognized supply channel be used for handling I&E supplies.

(4) A standardized set of textbooks. be adopted, stressing popular courses.

Artillery and Air Support of Ground Attack

Cassino — 1944

Major James W. Walters, Jr., *Field Artillery*
Former Instructor, Command and Staff College

ON 15 March 1944, elements of the Fifth Army in Italy made an attack on the German stronghold of Cassino. This assault, being preceded by a four-hour aerial bombardment and accompanied by heavy artillery support, was a rather unique operation in World War II. It demonstrated that a heavy preparation prior to an attack does not always insure a complete success.

Fifth Army, after its landing at Salerno in September 1943, had fought its way across the Volturno River seventy-five miles northwest through Italy until it was stopped in December before the German Gustav Line and Cassino. The town of Cassino, with the high ground to its immediate northwest, was a key strongpoint of the Gustav Line. It was situated astride the best road to Rome, Route 6, and commanded the entrance to the best approach to Rome, the broad Liri Valley. During the months of December, January, and February, numerous attacks were launched in the Cassino area either directly or indirectly at the town itself. By early March, these attacks had succeeded in forcing a small bridgehead across the Rapido River at Cassino and about one-tenth of the town was held by our troops. In addition, Allied troops had managed to take and hold some high ground to the north of Cassino. The general situation in Italy just prior to 15 March is shown in Figure 1.

Terrain

Cassino was a very easily defended locality. Just in front of the town there was a natural obstacle, the Rapido River. The town itself was of very sturdy concrete and stone construction, honey-combed with caves, tunnels, and deep cellars. Directly behind the town was a sharply rising hill called Castle Hill, or Hill 193, the top of which was 100 meters above the town. Approximately 1,200 meters southwest of the town and over 500 meters above Cassino was Monastery Hill on which was located the famed Monastery of Montecassino. This monastery, together with Monastery Hill, afforded the Germans superior and practically unlimited observation of the terrain in all directions. Monastery Hill was definitely the key to Cassino. Cassino would be untenable by the enemy if this hill could be taken and held.

Defenses

The Cassino area was defended by elements of the 1st Paratroop Division, one of the best divisions in the German Army. The 3d Regiment of this division was well emplaced in Cassino proper and on the hills between Cassino and the monastery. This regiment was generally disposed with its 1st Battalion on the slopes of Monastery Hill, its 2d Battalion in the town itself, and part of the 3d Battalion defending the area just south of the town generally along the Rapido River. Units

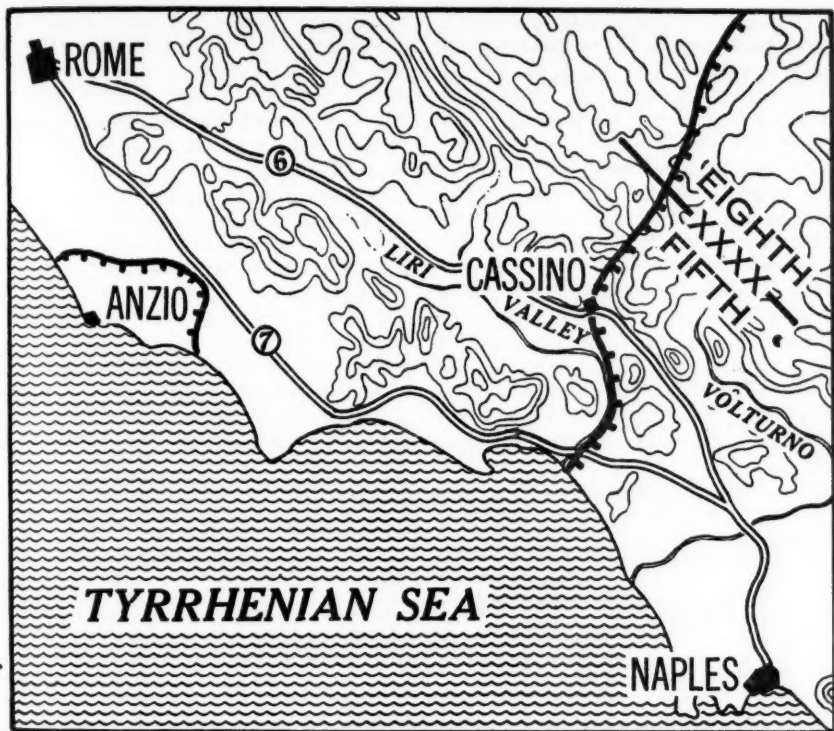


Figure 1.

in Cassino had organized their defense carefully. They had taken full advantage of the sturdy buildings and had utilized the reinforced cellars of demolished structures as strongpoints. The caves and entrances to tunnels in and about the town afforded the troops excellent bomb shelters, ammunition caches, and gun positions.

The 4th Paratroop Regiment of the 1st Paratroop Division defended the high ground north and west of the monastery while elements of the 15th Panzer Grenadier Division held the mouth of the Liri Valley to the south of Cassino. .

General Plan

The attack against this position was to take place 15 March 1944. The mission was to blast out the Germans with an intense aerial and artillery bombardment followed by an attack by New Zealand infantry supported by tanks. Following the capture of Cassino and Monastery Hill, Combat Command B of the 1st Armored Division was to exploit in the Liri Valley to the Adolf Hitler Line, eight miles to the west.

Air Support

The aerial bombardment phase was to commence at 0830, 15 March. From 0830 to 1200, bombing attacks on Cassino were

to be made at fifteen-minute intervals by eleven heavy groups of the Mediterranean Allied Strategic Air Force and five medium groups of the Mediterranean Allied Tactical Air Force. During the afternoon when the ground attack was to be launched, heavy and medium bombers were to attack targets west of Cassino, and fighter bombers and light bombers were to attack point targets in the battle area on call by ground troops.

At exactly 0830 the first formation of bombers appeared over the target and dropped their bombs. From 0830 to 1200 the Cassino area was attacked by approximately 500 B-25's, B-26's, B-17's, and B-24's dropping over 1,100 tons of 1,000-pound instantaneous high explosive bombs. Nearly 100 P-38's patrolled the area during the morning bombardment. There was no enemy opposition by either fighters or

antiaircraft artillery. Ground observers reported that the medium bombing of Cassino was most accurate and concentrated; whereas, attacks by heavy groups were less concentrated, but generally very effective. Approximately fifty per cent of the bombs fell in the town itself.

During the afternoon a cloud cover over the Cassino area precluded further bombing by heavy and medium bombers. However, from 1300 to 1700, light bombers and fighter bombers, principally from the XII Air Support Command, participated in direct support missions for the ground troops. During this time, fifty-four tons of bombs, ranging from twenty-pound to 1,000-pound bombs, were dropped with very accurate results. The principal targets attacked were the south side of the town of Cassino, the Cassino railroad station, and the slopes of Monastery Hill. In ad-

CALIBER	NUMBER OF ROUNDS EXPENDED			NUMBER OF WEAPONS
	II CORPS	NZ & X CORPS	FRENCH CORPS	
3-inch gun	3582	0	0	72
25-pounder	0	118475	0	312
105-mm How	13408	0	9513	156
4.5-inch gun	0	10828	2071	48
5.5-inch How	0	9114	0	56
155-mm How	7911	0	8662	120
155-mm gun	3228	0	3750	60
7.2-inch How	0	72	0	8
8-inch How	4327	0	640	48
240-mm How	388	0	0	10
TOTALS	32844	138489	24636	890
Total Pieces Firing—890				
Total Rounds Expended—195,969				
Total Tons Expended—4,230				

Figure 2.

dition to these direct support missions, approximately 100 fighters patrolled the area with only slight opposition.

Artillery Support

The artillery support of the attack against Cassino commenced at 1200, 15 March and continued until 2000. During this eight-hour period, 890 guns and

howitzers fired close to 200,000 rounds in the Cassino area. The artillery support was divided into two separate categories.

The first category was more or less direct support firing by 144 twenty-five-pounders of the New Zealand Corps. These weapons maintained a rolling barrage in front of the attacking infantry which was

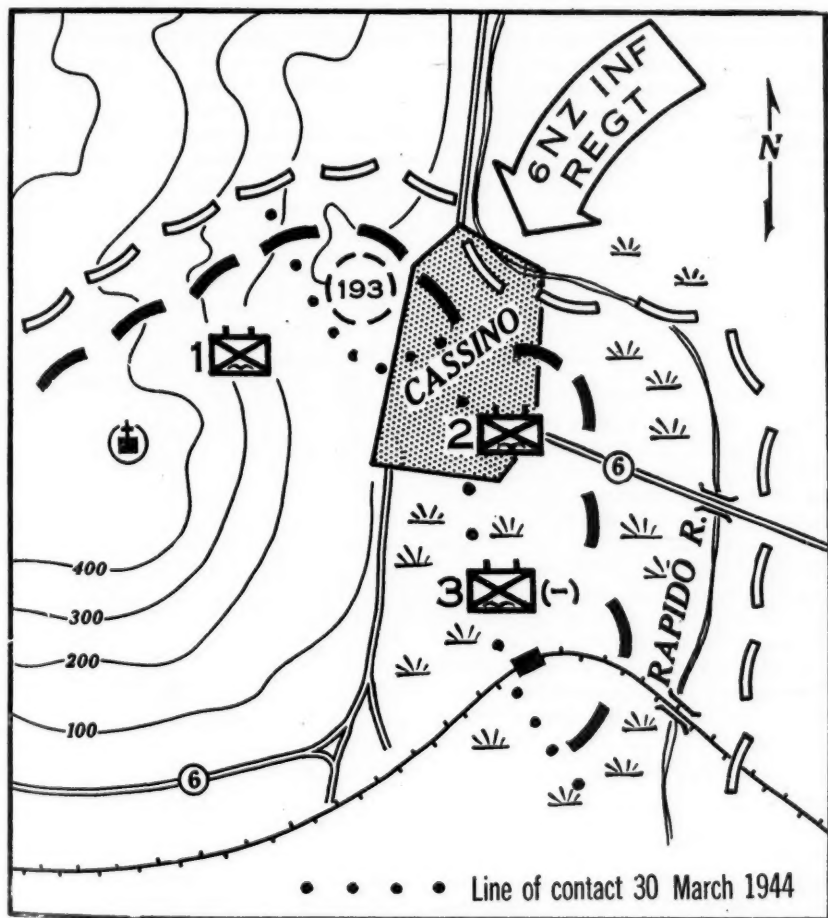


Figure 3.

planned to creep through Cassino from one end to the other. The New Zealand infantry battalions followed this wall of fire from 100 to 200 yards. (See Figure 2 for rounds of artillery expended.)

The other category of the field artillery support of the attack was general support firing by artillery of the French Corps, The United States II Corps, and the British X Corps. This phase consisted of a preparation of prearranged scheduled fires directed against German strongpoints, heavy weapons positions, and observation posts. It also included long range interdiction fires and extremely dense counterbattery fires assisted by continuous surveillance and adjustment by P-51's of the 111th Tactical Reconnaissance Squadron.

Our artillery received practically no counterbattery fire on the first day; it was only after the attack had bogged down that any German artillery fire commenced falling on our gun positions.

Opinions of Prisoners of War

Captured German soldiers who were in or near Cassino on 15 March gave the Fifth Army interrogators considerable first hand information of the result of the bombing and shelling from the German soldier's point of view. In general, the prisoners stated that the aerial bombardment and the artillery fire were equally effective. They thought that the artillery and mortar fire was well directed and extremely accurate. Also, the artillery fire probably inflicted more casualties after the bombing had reduced quite a bit of the cover.

Effect on Defenses

The prisoners reported that the bombing and shelling of the last two months, together with German demolition work, had already reduced to ruins most of Cassino's buildings before the 15 March assault. The cellars of these structures had been relatively untouched and, with some

improvements, made excellent shelters and strongpoints. During the bombing of 15 March any houses that had been left standing were soon flattened by the direct hits or enormous blasts. Most of the standing houses that were destroyed were used only as sleeping quarters and had little military significance. Quite frequently, though, men in houses or in cellars were buried in the rubble and managed to extricate themselves only in time to be taken prisoner. The defense of Cassino also included mobile pillboxes called "crabs" that were designed to hold two men. During the bombardment, however, the prisoners reported that as many as six people took shelter in these pillboxes. When a bomb fell only a few yards away, the pillboxes were often lifted out of position but still the occupants were not badly injured. Numerous weapons under light cover were destroyed, or the sheltered gun crews were cut off from access to their pieces by falling masonry. In many cases men left their individual weapons unattended in their haste to seek refuge and were unable to retrieve them later. All telephone communication was completely disrupted.

Casualties

According to reports made by prisoners, the casualties in Cassino during the bombing and shelling varied with the locality of the reporting troops. Prisoners from the 2d Battalion of the 3d Paratroop Regiment, which bore the brunt of the bombing, told of huge casualties. One survivor believed that less than ten of an original sixty in his organization escaped with their lives. Another prisoner of war said he was the only survivor of his group of fifteen to twenty men. Some surviving prisoners were surprised to learn that other German soldiers had been taken alive in Cassino. On the other hand, troops which were either sheltered in well protected cellars and caves or in areas not as severely hit as the north part of town

did not describe heavy casualties. They inferred that the bombing produced a short term demoralizing effect and a sense of confusion and that it temporarily disorganized the defense, but few casualties were suffered. Those who were sheltered in deep bomb-proof caves had no casualties other than a few split eardrums.

Mental Effect

A special psychiatric report made on five prisoners from those troops captured in Cassino stated in general that the bombing had slight effect on the Germans mentally. However, these troops in the 1st Paratroop Division were a special group of highly trained men and were far superior to the average German soldier. Also their prepared positions gave them considerable protection against concussion. Lastly, it was stated in this report that war neurosis rapidly disappears when the prisoner realizes he is safe and out of the war.

Ground Troops Report

Despite the heavy aerial and artillery support, the ground attack by the 6th New Zealand Brigade, supported by the 19th New Zealand Armored Regiment, failed to accomplish the desired results. Cassino was never entirely taken nor was a breach in the line created through which the armor could exploit in the Liri Valley. Initially, there was slight opposition in the greater part of the town proper. But upon reaching the main enemy defensive area, which was located in the south and west portions of the town, fierce opposition was encountered. The New Zealanders seized Hill 193, and elements of the 4th Indian Division, operating on the right flank of the New Zealand Brigade, captured several points on the slopes between the monastery and the town. The Indians were cut off almost immediately by the enemy and had to be supplied by air. Eventually the Indians withdrew from these forward positions. On the fifth

day of the attack the Cassino railroad station was taken from the west. As days went by, the 3d Paratroop Regiment was heavily reinforced by the remainder of the division, and the action soon became a stalemate. Small forces of enemy troops were constantly appearing behind our lines which resulted in fierce house to house fighting with no definite front line recognizable. When the attack was finally called off after about fifteen days of fighting, our troops had advanced to the dotted line shown in Figure 3.

The artillery barrage, it was stated, had little effect in keeping the enemy's head down since his strongpoints seemed to be constructed with shell-proof ceilings. Because the infantry was slowed considerably by enemy fire shortly after reaching the west part of Cassino, they found it impossible to follow the artillery barrage all through its course. However, several repetitions of the barrage at certain points were requested by the New Zealanders and were accomplished by the artillery. Although smoke was used successfully in the attack against Hill 193, enemy observation posts all along the slopes of Monastery Hill could not be smoked enough to prevent observed fires on our troops.

The effect of the aerial bombardment in the morning was brought out by a battalion commander of an assault battalion who stated he believed the majority of the Germans withdrew to the cellars and caves during the bombing. It was felt, therefore, that because of this the bombing did not attain the desired casualties among the enemy that had been anticipated.

All vehicular movement to and in Cassino was restricted. This was due partially to continued enemy sniping and shelling, but due particularly to the fact that the roads and bridges had been thoroughly destroyed and cratered by our own bombing. Because of this destruction, the se-

lected route of advance for tanks of the 19th New Zealand Armored Regiment was blocked entirely, and a substitute route had to be used. Even then, movement forward into the town was impossible without engineer work. This work had to be accomplished under constant enemy observed fire. Altogether, the armored forces, hindered by bomb craters, found the going extremely slow and never did penetrate the main defensive position of the enemy.

The New Zealand Corps, under which the 6th New Zealand Brigade was operating, stated that a great deal had been learned from this attack:

"(1) Heavy bombers operating from 14,000 feet are not accurate enough for this class of close support. Medium and light bombers are excellent. If the air force could have used more medium bombers and still kept up the weight of the attack, the results would have been better.

"(2) The number of infantry put in was limited by the narrow approach from the north, more infantry must be employed, and mopping up must be done by parties detailed to each building, if necessary.

"(3) The destructive power of heavy bombs makes the terrain impassable to tanks, and all exploitation by armor must

be clear of the area which is bombed on this scale."

Conclusions

The ground attack was not successful. True, initial successes were scored, and portions of Monastery Hill were taken, but few of the positions taken initially could be held. The artillery and aerial bombardment support was not without flaw. For instance, it was reported after the attack that the artillery fire was not completely effective in neutralizing the enemy strongpoints. Furthermore, the ground troops stated that the bomb craters completely stopped any movement of armor through the town. But there was one factor in favor of the enemy that could not be neutralized or destroyed by any amount of artillery or air support. That factor was terrain, specifically Monastery Hill. With the enemy having this superior observation, it was impossible for our troops to advance and hold ground. Even ten times the weight of bombs and artillery shells expended could not have effectively reduced this observation. The bombing and shelling of Casino on 15 March 1944 did not assure a complete success by the ground troops. However, the lessons learned from this attack served to make later operations of this nature completely successful.

The greatest lesson of this war has been the extent to which air, land and sea operations can and must be coordinated by joint planning and unified command. The attainment of better coordination and balance than now exists between services is an essential of national security.

General of the Army Henry H. Arnold

Logistical Service

Lieutenant Colonel Robert C. Erlenbusch, *Cavalry*
Instructor, Command and Staff College

AT the time of the writing of this article, the plan for this nation's post-war military establishment is still in the state of ferment. World War II brought forth new techniques in the conduct of warfare; unprecedented technological developments; unparalleled expenditure of the nation's wealth and resources. Furthermore, World War II taught the peoples of the world many lessons, the foremost of which is that modern warfare is global, it is total, it strikes without warning, with violence, and heretofore unbelievable destructiveness. A type of warfare which threatens humanity itself was born in World War II. Half-measures and unsound judgment in the formulation of a post-war military establishment, therefore, cannot be tolerated. It is, then, for this reason, that the planners of the nation's post-war military establishment are proceeding slowly and with caution. Of course, the adoption of the final plan is not the decision of the military or of officials of the government, but of the people of this country. Theirs is the task of analyzing the factors involved in the cold light of reality, and approving a post-war military establishment that will insure the prosperity of this country and aid in the establishment of world peace.

These factors for analysis are four in number: military policy, industrial potential, natural resources, and national finance. They should not be studied singly, but simultaneously, weighing one with the other to obtain the proper perspective.

The conclusions reached in each of these four main issues will in general indicate the requirements for a post-war military establishment.

The present military policy of this nation has not yet been stated in so many words, because its final definition is dependent upon the conditions of the yet unsigned peace treaties and the delineation of future international obligations. A tentative military policy, for the purpose of planning and analysis, however, may be assumed by summarizing the generalities stated from time to time in the press. Such a military policy would be as follows:

1. The maintenance of the security of the United States, its territories and needed bases.
2. The maintenance of peace in the Western Hemisphere.
3. The fulfillment of our commitments in the areas occupied by our armed forces abroad.
4. The execution of our commitments for the maintenance of world peace.
5. The maintenance of the United States in a sound position relative to any potential rival.

Such a military policy indicates that our post-war military establishment will be relatively large. It implies that our armed forces should be well-trained and well-equipped. It dictates that military research and development be continuously and enthusiastically fostered. And, it demands that logistical service and sup-

port in such an establishment be efficiently controlled.

As to the nation's industrial potential, viewed in the light of past achievement, it is reputed to be the greatest in the world. However, viewed in the light of a potential rival's capability to destroy it, or render it ineffective by the newly developed techniques of modern warfare, this same industrial potential loses even its semblance of superiority. In other words, in the coming age of atomic energy and supersonic speeds, our present industrial structure will be inadequate. The post-war military establishment, in its final form, therefore, should contain provisions to secure industry against the newly developed techniques of modern warfare and to maintain the nation's industrial potential at least on a par with that of a potential rival's.

The factor of natural resources is, today, indeed acute. In the field of mineral resources alone in 1939, the Army-Navy Munitions Board classified thirteen minerals as strategic, meaning thereby, that they were essential to national defense and that dependence for them must be placed in whole or in substantial part, on sources outside the continental limits of the United States. In 1944 this list had grown to a total of sixty-five. With the rapid development of technological improvements, the future size of this list of strategic minerals can only be conjecture. Here again, the post-war military establishment must be so designed as to conserve our natural resources and to develop, through controlled research, substitute materials, or where no substitute can be developed, to acquire by purchase, adequate reserves of these critical materials.

And lastly, the nation's financial status is practically without parallel in world history. The national debt, plus present financial commitments, is, for all intents and purposes, double the nation's

estimated wealth. Therefore, the keynote of our post-war military establishment must be economy—economy in the sense of receiving a dollar's worth of value for each dollar spent.

Mr. Howard Bruce, former Director of Matériel for the Army Service Forces, in an analysis of the supply lessons of World War II, summarized his conclusions as follows:

"1. There should be promptly completed a broad plan for industrial mobilization of the United States for any future all-out war. The work should be carried out now when the experiences of World War II are fresh in the minds of many who had a part in the industrial war effort and whose experience and conclusions are available for aiding in the preparation of such a plan.

"2. We should keep in operation, even if in skeleton form, the matériel controls so vitally needed in war time. We should make constant economic studies of changing requirements of matériel and manpower.

"3. The principles of supply control, as practiced in the ASF during the latter part of World War II, might well be applied to plans for *all* (military) procurement, including as well, studies of wide geographic distributions of supplies and proper allocation of contracts in accordance with manpower available.

"4. Of equal importance is the need for unremitting pressure behind our research and development program.

"5. Experience certainly emphasizes the need of ample stock piles of materials for which there are enormously increased demands in time of war, especially of those materials we obtain in whole or in part from other countries.

"6. When expanding matériel and manpower to the ultimate limit, there must, at every level, be some referee to rule on the relative importance of needs. There must

be, as there was in the late war, a referee between civilian needs and military needs, and again as between the needs of the several military agencies. This referee should not be a coordinating agency but should have the power to command.

One organization, then, which would be capable of fulfilling the logistical requirements previously mentioned and be capable of implementing the lessons of World War II with regard to supply as summarized by Mr. Bruce, and which should be included in our post-war military establishment, might be called the Armed Forces Logistical Service. This organization, to obtain the proper coordination and cooperation between military and civilian enterprise, would be composed of military and civilian components. Its structure should be objective rather than functional. In short, this organization would be a directorate which would direct the logistical activities of our post-war military establishment, and which would control our national resources to insure the efficient accomplishment of our military policy and to insure our prestige in future international relations.

The Armed Forces Logistical Service, as a part of the post-war military establishment, appears to have many advantages when studied in the light of the requirements for a post-war military establishment previously mentioned in this article.

Four main advantages are readily apparent. First, the Armed Forces Logistical Service, being a central directorate, could control military research and development to avoid duplication of effort and waste of time, energy and resources. Furthermore, being composed of military and civilian components, it could coordinate the efforts of civilian and military scientific enterprises to insure the proper dissemination of scientific knowledge and to direct the effort of both in essential development.

Second, this organization, being the

sole logistical organization in our post-war establishment, and being composed of military and civilian personnel, could effectively study the problem of industrial security against the newly developed techniques of modern warfare, and could direct and control the energies of private industry to effect industrial security. And further, by instigation of proper legislation, they could direct the relocation of industrial areas as a defense measure, and the reorganization and control of our present transportation system to meet future requirements. Thus, this organization would be the guardian of our industrial potential.

Third, the Armed Forces Logistical Service, by its very position in our post-war military establishment, could control the use of the strategic raw materials and direct the acquisition of adequate reserves of these materials. Through its civilian component, it could obtain the cooperation of private enterprise by fostering research for substitute materials, by encouraging exploration for the discovery of new sources of raw materials and by stimulating development of new industrial techniques in the extraction of needed material from inferior or low grade mineral ores. Through its military component, it could control the conservation of these vital natural resources by directing the procurement of military supplies and equipment and by dictating the specifications for the development and manufacture of new equipment.

Fourth, this organization, with its inherent control activities, would obviate the necessity for the numerous coordinating agencies, such as the War Production Board, the Office of Defense Transportation, Army-Navy Munitions Board, etc., thus reducing governmental overhead costs. Furthermore, the Armed Forces Logistical Service would, by its very organization, eliminate the duplication of Logistical Service between the various

branches of our armed forces, thereby insuring a more efficient utilization of military manpower and effecting a substantial monetary saving. Again, this organization, by its ability to direct procurement activities, could materially lessen the cost of procurement in the military establishment.

The disadvantages, however, to such an organization stem from the imponderable human factor. This organization would have power and authority which might reach dictatorial proportions, and because of this power could be used as a tool to further the private aims of a few unscrupulous individuals instead of being used to nurture national strength. This disadvantage, however, could be held in check by intelligent legislation on the part of the people of the nation. Another purely military disadvantage is that such an organ-

ization could conceivably usurp the time proved prerogative of command. Nevertheless, this disadvantage could also be minimized by intelligently defining the command relationship between the various branches of our military establishment.

In conclusion, it might be said that the necessity for a single logistical service in our post-war military establishment is dependent upon national policy. If our national policy is predicated on the assumption that any future war will strike without warning with the objective of subjugating this nation, preparedness is mandatory, and the Armed Forces Logistical Service is a necessity in our post-war military establishment. If our national policy is predicated on any other logical and realistic assumption, the Armed Forces Logistical Service should be included in our post-war military establishment as an investment in "Peace Assurance."

It is obvious that, when operations must be carried on at sea, in the air and on the ground, logistics planning must be organized to provide the correlated requirements for the three combat forces and to integrate the means for getting them to the scene of action. These activities must be so controlled that each force is provided with what it needs without waste or shortage, in a word, with the utmost efficiency. A single head can guide and direct such planning more efficiently than any type of committee action.

General Brehon Somervell

MILITARY NOTES

AROUND THE WORLD

GERMANY

Germany's Inland Waterways

The ruthless and wanton destruction inflicted by the retreating German forces on their own bridges, barges and facilities of Germany's inland waterways is slowly but steadily being repaired to revitalize an important part of the country's internal communications system.

As waterways are considered to have less war potential than other means of transportation in Germany, MG (Military Government) seeks to encourage the Germans to assume greater administrative responsibility for their water transportation facilities, to rehabilitate them to serve essential carrier requirements.

The picture was a gloomy one on VE-day for the German people and for occupational authorities coming in to help the Germans to build a democratic way of life. The German forces, in their mad retreat before the Allied armies, had destroyed nearly all the bridges across the rivers and canals and left their wreckage blocking the channels. Barges and tugs were wrecked at docks, along river banks and in midstream. The locks and dams in the canal systems were in a shambles: cranes and port equipment that had survived Allied bombing were wrecked; harbors were littered with derelict hulks.

Transport System Wrecked

Germany's inland waterways system that formerly carried one-fourth of all

the cargoes transported in Germany; that consisted of over 8,000 kilometers of navigable waterways; that included more than 6,000 barges, tugs and coastal craft; that had some of the largest and best equipped ports in the world, was almost completely *kaput* from the battering of the invading Allied armies and the deliberate destruction of the retreating Germans.

Immediately after the surrender, and in many areas before the cessation of hostilities, the Allied armies tackled the problem. Military engineers spanned the waterways with temporary bridges to reopen major highway and rail routes. Floating ponton bridges with removable sections to permit passage of craft were flung across the navigable rivers and canals. Under the direction of the Engineer officers, German wrecking crews with cranes and salvage equipment started cutting away the wreckage and hoisting huge sections of damaged bridges out of the river beds so as to permit through-navigation. At the same time, Germans under the direction of transportation units, port companies, marine repair and harbor craft companies went to work on the port facilities, tugs and barges. Damaged piers were repaired and wrecked cranes were disassembled and cannibalized to make one serviceable unit out of part of several damaged ones. Sunken craft were raised, hulls were patched and engines repaired.

Progress by U.S. Army

During the summer and fall of 1945 progress was achieved by the U.S. Army Engineers and Transportation Corps troops in their work to restore the waterway system in the United States Zone of Occupation. On 7 August 1945, the first barge was able to come up the Rhine River from Wesseling to Mannheim. On 21 October 1945, the first Liberty ship was berthed at Bremen to discharge army supplies. On 15 September 1945, the Danube was open to navigation throughout the entire U.S. occupied portion of Germany. Barge delivery of coal from the Ruhr mines to the U.S. Zone rose sharply from approximately 5,000 tons in August to approximately 95,000 tons in December 1945.

On 1 February 1946, a major change in occupation policy was initiated with the transfer of responsibility for operation and maintenance of waterways in the U.S. Zone to German civilian engineers, barging and towing agencies and companies, under the supervision and policy control of MG. This significant move increased the duties, responsibilities and authority of denazified German officials, permitting a greater degree of self gov-

ernment and administration. In February this policy was expanded to include Weser River ports in the U.S. Enclave at Bremen.

OMGUS Responsibilities

The responsibilities of the Transport Division, OMGUS (Office of Military Government, U.S.) with respect to the German water transport system, are now confined to formulation of policy, and making certain that such policies are carried out by the Germans. However, the scope of the water transportation problem and its effect upon practically every phase of economic activity in Germany, and even in Europe as a whole, is so far-reaching that water transport policy makers find their duties almost unlimited by geographical, political, or industrial boundaries. The responsibilities of the Water Transport Staff range from internationalization of Rhine and Danube waterways to establishment of marine courts at Bremen; from restitution of craft seized by the Nazis to selection of fuel for efficient operation of tugs; from conferences on a diplomatic level to allocation of steel for repairs to vessels.

(*Weekly Information Bulletin*)

GREAT BRITAIN

Automatic "Bail-out" Device

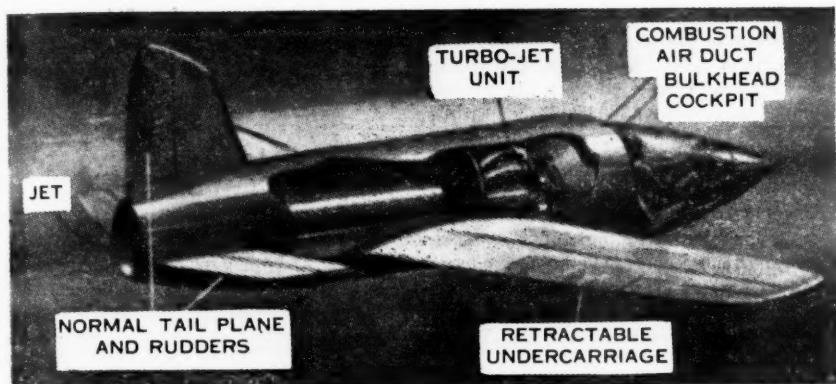
Supposing the pilot of a jet plane decides that he must bail out although traveling at 400 miles per hour. With the new Martin-Baker device, he pulls a canvas screen over his face by means of two rubber toggles. This action instantaneously puts his body and limbs in the best position for ejection, as already he is fully strapped to the seat. It also fires the cartridges and the charge pushes a piston, attached to the rear of the seat, straight up an expansion tube and thus the seat shoots out of the cockpit complete

with occupant. An automatic means of firing off the hood first is part of the complete apparatus.

When in the open air, the seat rolls over on its back, but by this time it, with its occupant, is well clear of the tail and some hundreds of feet behind the aircraft.

The whole process is roughly equivalent to entering in an instant a solid wall of air, and the release of the pilot parachute or drogue had to be carefully studied. Automatic means have also been devised for this release.

(*The Aeroplane, Great Britain*)



Attempt to Surmount Sonic Barrier

The "Miles 52" (above) a design recently exhibited at Farnborough, and which may be the first machine to fly faster than sound. The diagrammatic drawing shows the situation of the jet and gas turbine units and the semi-reclining position of

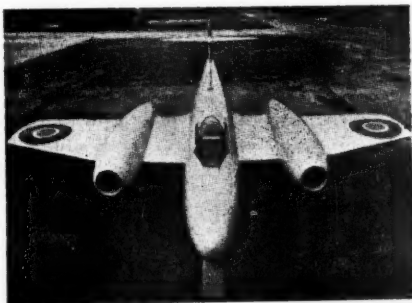
the pilot, who at this velocity would be subjected to great strain. The cockpit will be detachable, thus facilitating a parachute descent in an emergency.

(*The Sphere*,
Great Britain)

New Meteor

Standard version of the Gloster Meteor, British jet-propelled fighter, now has clipped wings, reducing the span from forty-three to thirty-nine feet. (See photo, right.) The aileron stretches out to the tip of the wing. Despite the decreased parasitic drag, it is not expected that the aircraft's performance will be much changed due to other factors.

(*Aviation News*)



UNITED STATES

Pipelines

At the peak of military operations in Europe, Army Engineers pumped an average of 3,800,000 gallons of gasoline daily from ports in France and Belgium through three major pipeline systems to

the American armies. The longest lines in each system extended across the Rhine River.

"The three pipeline systems included 2,380 miles of six-inch and 1,440 miles of

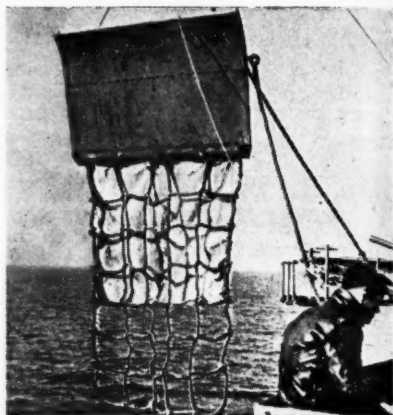
four-inch pipe. The major system from Cherbourg to Mainz had a daily capacity in excess of 1,700,000 gallons. The northern system from Antwerp to Wesel pumped more than 1,300,000 gallons while the southern pipeline, extending from Marseille to Worms, carried over 700,000 gallons daily."

Twenty Engineer Petroleum Distribution Companies including only 4,400 officers and men, operated these extensive pipeline systems which handled the bulk of POL (Petrol, Oil, and Lubricants) delivered to the continent by the Transportation Corps.

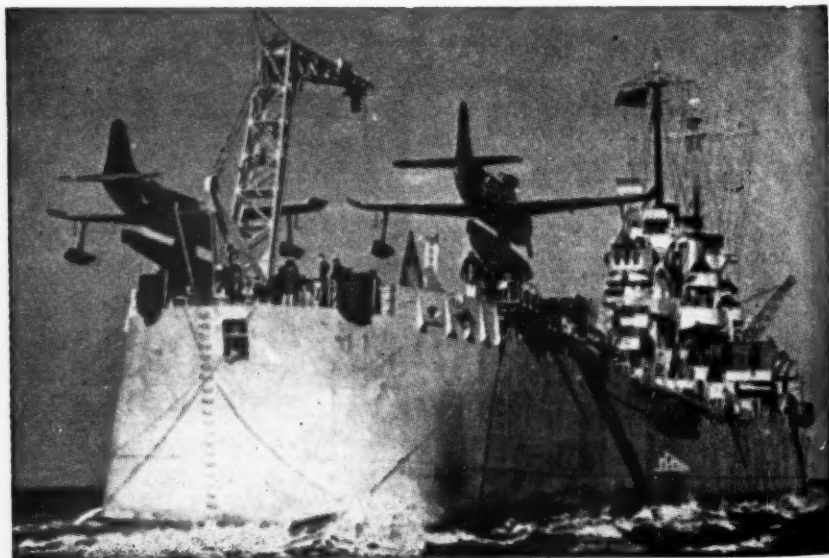
Without the pipeline, 70,000 men operating thirty thousand 2½-ton cargo trucks would have been required to handle the same volume of gasoline over the same distance in the form of packaged cargo, that is, five-gallon "jerricans." Transportation in bulk form would have required a minimum of 31,000 men and 13,000 semi-trailer 2,000-gallon tank trucks.

(The Military Engineer)

A Recovery System for Ships' Aircraft



The "Charlie" system of recovering ships' aircraft from the sea, staged by the U.S. Cruiser *Denver*. To relieve the pilot of the necessity of dangerous jockeying in rough seas while waiting to be



hoisted on board again, this system employs a "sled" float onto which the returning aircraft taxis and is then drawn into the correct position alongside its parent ship for the hoisting tackle to be hooked on.

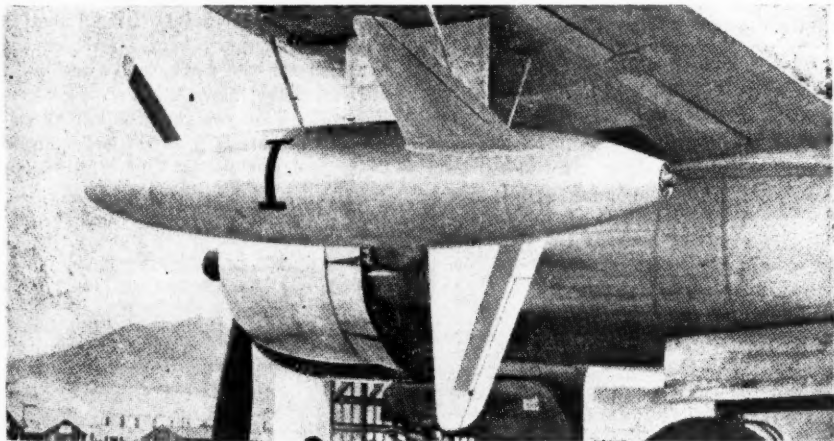
(The Illustrated London News)

View into Future

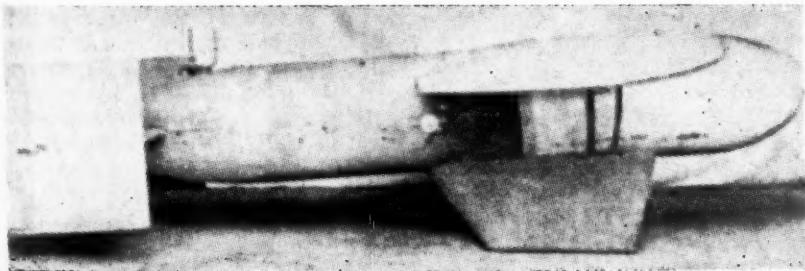
The Army Air Forces have developed many guided missiles in a far-reaching program. Attached to the wing of a Douglas A-26, a JB-3 which is powered by a resojet engine, is launched when

the mother plane is flying at about 300 miles per hour. JB-3 is controlled during the initial stages of its flight by an operator in the A-26. After that, a special device in the nose guides it to the target. Another missile, the GB-4, carries a 1,000-pound bomb, and is also launched from the air. It is not powered, but glides into its target, guided either from the air or ground through television equipment in the box protruding from its belly.

The GB-7, another in AAF's stable of plane-launched guided missiles, is a standard 1,000-pound bomb suspended in an



GB-4. (AAF photo.)



JB-3. (AAF photo.)

Aeronca-built two-control airframe. The nose contains a device that guides the bomb directly into an enemy radar station when the station is turned on.

The tank of the GB-11 can be filled with chemical sprays. The GB-11 is also launched from a plane and is guided to its target by radio. GB-7 and GB-11 are similar in appearance to GB-4.

(Aviation News)

Navy Unveils First Twin-engine Helicopter to Fly

McDonnell Aircraft Corporation and the Navy recently took the wraps off the world's first flying twin-engine helicopter, the XHJD-1, which will cruise at more than 100 miles per hour carrying a useful load of over 3,000 pounds. (On occasion

the load has been as much as 4,000 pounds.)

Powered with two 450-horsepower Pratt and Whitney Wasp jr. engines, the XHJD-1 uses twin rotors of forty feet diameter attached to the fuselage on either side by long pylons which carry the engine nacelles midway. The aircraft will fly on either of the two engines, since either engine will drive both rotors through a system of overrunning clutches. The twin-rotor system eliminates need for an anti-torque rotor at the tail since the large rotors rotate in opposite directions.

Navy Bureau of Aeronautics officials in announcing the XHJD-1, said that an extensive program of flight research was scheduled for the aircraft. Variations of rotor diameter, blade chord, rotor-engine gear ratio, gross weight, and control sensitivity will be tested on the helicopter in "every worth-while arrangement."

(Aviation News)



FOREIGN MILITARY DIGESTS

A Technical Intelligence Officer in Burma

Digested at the Command and Staff College from an article by Captain R. H. Hearn in "The Journal of the United Service Institution of India" April 1946.

WHEN the Japanese war started, we knew nothing about their equipment. They had guarded their secrets well. In the first year we made no headway in gaining information about their weapons of war. Descriptions started coming in at first from the Australians and Americans following their counterattacks in the southwest Pacific, but although we received full information about the equipment captured, the gilt was missing from the gingerbread. We could not examine and strip the equipment ourselves.

As the tide turned and the Fourteenth Army advanced, large quantities of equipment of all types fell into our hands. It was a veritable windfall, and a mass of information came our way. It was published in pamphlets for forward troops, helping them to make immediate use of captured equipment. Many items were sent back to Indian training centers; and specimens were sent to England to help in the training of troops likely to come out East after the end of the European campaign.

In Europe, British and American technical intelligence teams worked in close liaison with forward troops and inspected new types of enemy equipment. German

equipment found to be in advance of ours was flown back to England for examination, and experts copied or improved it for our own use.

The same principle was followed in Burma, only on a much smaller scale, with the marked difference that whereas in Europe equipment could be flown back to England in a few hours, in Burma vast distances had to be covered. Heavy equipment, such as tanks and guns, often had to be sent back hundreds of miles under difficult conditions before reaching railroad head. Air evacuation was used as far as possible, but planes were mainly used for wounded and mail, and in any case aircraft available was limited.

In the first phase of the Burma campaign, two Technical Intelligence Officers operated, one in Arakan and the other in Central Burma. Early in 1944, when we began regaining the initiative, these two officers dealt with all new types of Japanese equipment, examined them, wrote technical field reports on them, photographed them and dispatched them to Inspectorates in India.

Their work was divided into three categories. First, and most important, to assist the forward troops. In Burma sup-

plies had to be carried over bad roads and through monsoon weather; delay was unavoidable, and sometimes important supplies were lost. They were often short, too. The invasion of Europe was first priority then. It resulted in shortage of material for Burma—a fact understood by the troops, but not always appreciated.

Thus every gun, tank, tractor, vehicle, shell, grenade or other equipment had to be utilized. Many times battalions were saved from serious setbacks by using newly-captured equipment, more especially the Japanese light and medium machine guns. The Japanese grenade discharger became a popular weapon with our troops; it was extremely accurate, simple to work, and easy to carry. Many types of weapons captured were copies of our own or American types, but occasionally new types were found, and it was then that the Technical Intelligence Officer was called in.

At first our troops were apprehensive of using this captured material. Everything "Made in Japan" was regarded with mistrust and thought to be useless and out of date. I suppose the thought originated from pre-war days, when Japanese articles were cheap and disintegrated at the slightest touch.

But Japanese peacetime goods and their weapons of war were very different. I do not pretend that the latter were up to British or American standards, but their main equipment was sound and dependable. I am always hearing the argument of the Japanese hand grenade. To use this crude weapon you have to strike its head against a hard surface, such as the rim of a steel helmet, and then throw the grenade very quickly; if you hold on too long, you are liable to have your fingers burned by the flash escaping from the vent hole by the fuze; moreover, the grenade is liable to explode any time between two and seven seconds. Obviously, it is best to leave them alone, or use them in a counter role as a booby trap.

Our second role was to write up detailed reports on newly captured equipment, and photograph each item. These field reports kept all theaters of operations in the picture. Direct liaison was maintained with the American and Australian technical teams, and thus up-to-date data on equipment captured in Okinawa, New Guinea or Burma was available. An unknown sight of a gun might be captured in Burma; without full details it would be impossible to forward a report, but by cross checking it might be found that the other half may have been picked up by the Americans or Australians. Thus we would be able to piece together a full description.

Having been inspected and photographed, the part would be sent to one of the Inspectorates in India for detailed examination. In the case of guns "firing" trials would be conducted; tanks and tractors would be made "runners." Each item would be stripped and examined. Small pieces captured would be sent by air; others by road to Dimapur and on by rail to Calcutta. The farther we advanced, the longer and more difficult became the lines of evacuation.

For equipment of extra importance we had to evacuate it ourselves. The first 47-mm antitank gun captured in the Arakan in early 1944 was towed 150 miles to Chittagong at an average speed of thirty miles per hour, caught the boat with five minutes to spare, and was delivered to the Inspectorate in India within four days of its capture. Perhaps the best record was with a German 37-mm P.A.K. antitank gun, captured south of Kalembo. An immediate signal was received saying it had to be evacuated to Calcutta on the highest priority. It was hitched to the back of a jeep, towed 300 odd miles to Dimapur within twelve hours (which included time spent in retrieving a wheel of the gun, which fell

off every fifty miles), and sent post-haste on to Calcutta.

"Booby traps" are another part of the technical officer's job. I was in Burma from early 1944 to late 1945 and never came across a booby trap of any description. An American team which worked with me for eight months never saw one either. We were fortunate, for booby traps were laid by the Japanese, mainly on the more "sordid" principle, such as tying grenades to our dead or wounded. Japs did not employ them on such a large or crafty scale as Germans.

The pastime of booby-trapping houses and likely souvenirs, such as placing a grenade under a steel helmet, was done by the Japanese, but only on a small scale. I never heard of a booby trap being found in a dump, the main reason, I think, being that they had not the time, for from Kohima they were continually on the run, were short of ammunition, and were a beaten and dejected army.

Japanese defense positions had to be reported on from one point of view. Two outstanding instances were at Ayadaw and Monywa, both elaborate and carefully constructed defenses. In both, a company of men adequately stocked with food and ammunition could have held out for many weeks.

In September 1944, the first complete technical team was attached to XXXIII Corps, remaining with it from Imphal to Mandalay and on to Rangoon. A further team was attached to IV Corps later. They consisted of a British and an American technical officer, photographer and four American technical sergeants. As the advance continued, new equipment came into our hands. An unusually interesting piece was the 32-cm. mortar weighing 900 pounds, and firing a bomb weighing about 700 pounds. From a dump in the Fort at Mandalay enough new items were recovered to fill an American Com-

mando airplane, which carried about 10,000 pounds.

In Shwebo, one dead Jap was found. Every house, *basha*, temple was searched but the place had been systematically cleaned out. The Japanese took great trouble to camouflage and hide their more important dumps, often placing them in the middle of thick jungle, occasionally four or five miles from a main road. They were virtually invisible from the air, and even on the ground were no easy job to find.

We were with "V" Force, and in the lull before the main attack across the Chindwin there was continual warfare in No Man's Land. The Japs had established large dump locations in these areas, many of which they could have guarded better. The biggest was at Settaw, a small village across the Chindwin. Reports said that the dump stretched over an area of five miles, and contained every type of equipment. The opportunity was too good to miss. Three days' march over mountains brought us to "V" Force Headquarters. Late on the night of our arrival a Burman rushed into the camp and told us a Jap party with transport and 400 coolies were approaching the Settaw dump to salvage what they could.

Early next morning we set out, crossed the Chindwin, and reached the outskirts of the dump about midday. A wide track led east from the village, and at fifty-yard intervals were large wooden *bashas*, each stacked with equipment of all sorts, mostly ammunition and signal stores. Two miles up the track and, going round a sharp bend, we were confronted by a party of Japanese. Both they and we were equally surprised and dived into a jungle, which suddenly became alive with chattering monkeys. They leaped from tree to tree, making a lot of noise. Soon we were mistaking Japs for monkeys and monkeys for Japs.

During this rather uncomfortable lull

the American officer with a band of coolies was evacuating some of the more interesting items from the *bashas*. Withdrawing, we set fire to the *bashas*, and crossed back over the Chindwin.

Have you ever thought of the reasons bombers were able to destroy just the very places in Japan where we knew their armaments were being made? Apart from our espionage service there, the main source was handed to us by the Japs themselves. Attached to almost every item of their equipment was a nameplate, giving an unbelievable amount of information, date of manufacture, arsenal at which it was made, full name, type and number of the item. Every nameplate was removed and flown direct to Washington, where it enabled the authorities to pinpoint specific targets in Japan.

These nameplates were also useful in building up the approximate picture of the enemy strength. In March we might capture a medium tank numbered 53; in May two further tanks might be knocked out numbered 47 and 49. Knowing the complement of tanks in a Japanese tank regiment, in time the jig-saw puzzle would slowly complete itself.

I wonder how much the Japanese were able to squeeze information from us? How often did Private Jones go into battle with his shoulder flashes (patches) stuffed into his trouser pockets? He had taken them off, it is true, but he was not going to leave them behind for Private Brown to take them. How often did Captain Smith go into action with a picture of his girl friend tucked away in his breast pocket in an envelope with his unit's name on it? Numerous instances occurred of photographs, letters, envelopes being removed from dead Japanese which had originally been removed by them from our own killed or prisoners of war.

The Japanese really were unbelievably careless. Coveted Japanese flags were near-

ly always inscribed with the unit's and Commanding Officer's name; sometimes its battle honors would be listed as well. Almost every Jap carried a wallet stuffed with photographs, letters, and other small items of intelligence interest. Japanese prisoners were worth their weight in gold. Security was not their strong point. The Jap Higher Command had been confident that no Jap would fall into our hands alive; his duty was to commit *hari kari*. But there were black sheep, and as a result our Japanese order of battle in Burma was always very comprehensive.

Technical intelligence officers in the forward areas are regarded with reserve and suspicion, however tactful they may be. Many troops, especially Indians, were unaware that a "Technical Intelligence" branch existed. Officers, being equally ignorant themselves, were generally to blame. There is always a natural instinct with a fighting man, who, having killed his foe and risked his life in doing so, feels that what he has captured is his, and the motto "Help Intelligence to help you" is soon forgotten.

We found it best to adopt the principle that the customer is always right until he is tactfully persuaded to think otherwise. Working with the forward troops, our teams were able to prevent a lot of pilfering, though it had the disadvantage of being tied to only one area at a time. It was, however, fairly easy to appreciate the situation as to where to concentrate our forces; we were nearly caught over the Mandalay show, but just boarded the last ferry across the Irrawaddy and were able to be with the 19th Division when they captured the city.

Technical intelligence officers are now investigating arsenals and dumps in Southeast Asia, especially Malaya. Americans and Australians are combing Japan and the southwest Pacific. A complete dossier will be able to be compiled and Japanese

secrets laid bare, and it will be interesting to see if Japan was able to keep ahead of us. Many startling discoveries have been made and many more have yet to come to

light, disproving the ever popular myth that the Japanese spent their time copying other nations, and had little or no inventive capacity of their own.

River Crossings in Offensive Operations

Translated and digested at the Command and Staff College from a Russian article by Colonel B. Baranov in "Krasnaia Zvezda" (U.S.S.R.) 12 June 1946.

ALMOST all the major offensive operations of the Red Army involved river crossings. Such were the crossings of the Desna, Dnieper, Dniester, Vistula, Narva, Svir, Nieman, and Oder. Some of these took place following a prolonged contact, when the Red Army was preparing for an offensive and the Germans were on the defensive. Here, the operations of both sides were characteristic of action usually observed in fighting for well fortified positions, strengthened by the presence of a water barrier. The rapid advance of our troops and the methods of pursuit employed by the Red Army called for crossing the rivers without a pause for reorganization, or special preparations, in the majority of cases. This type of river crossing is the subject of this article.

It was formerly believed that any large river encountered in offensive operations meant an unavoidable pause which was necessary for bringing up bridging equipment and for the preparation of the forcing. "Watch the location of Soviet trains with crossing equipment," General Field Marshal Manstein radioed his troops when the Red Army had approached the Dnieper and when the Germans were all ready for the protracted defense of the west bank of the river. But the wide Dnieper was overcome by our soldiers immediately following their approach to the river and without waiting for the ponton trains lagging behind them.

The methods of organization for this

type of river crossing are practically the same, both in technique and in the volume of work to be done, as those used in well planned and well prepared crossings, but they have a few peculiarities.

Reconnaissance of the river, the terrain, and of the fortifications of the enemy is begun by all participating units long before the river is reached. The river is studied on large scale maps and by means of special military geographic descriptions, and considerable information is obtained from the files of local highway and river organizations, from prisoners of war, local inhabitants, and aerial reconnaissance. Thus, aerial reconnaissance carried out by the Second Ukrainian Army Group in September 1943 uncovered a considerable change in the river bed of the Dnieper, and this information, quickly disseminated, helped our troops in crossing the river.

It is necessary to determine in advance the location of crossings and the peculiarities of terrain, and to study the bank occupied by the enemy and areas which could be used for bridgeheads.

Reconnaissance activities (aerial and ground) determine the outline of the hostile main line of resistance, combat outposts, strongpoints, and obstacles. A considerable part of such reconnaissance data is supplied to regiments and divisions by higher headquarters. When approaching the rivers Sozh, Desna, and Dnieper, the White Russian Army Group compiled special brief descriptions, by area. These

records contained the following information: width, depth and rate of current of the river, available bridges and ferries, concealed approaches to the river, fords, river bed, and sectors selected for crossing. However, all regimental and divisional staffs should also obtain all possible information about the river and the enemy. For this purpose, they send ahead special reconnaissance parties, and question all prisoners of war and local inhabitants. Having approached the river, reconnaissance parties determine, by observation and other means, hostile routes of retreat, location and character of his crossings, and find, at the same time, local crossing materials and concealed areas for the concentration of our troops.

Special mobile detachments are formed to fight hostile rearguards. The mission of these detachments is not to let the enemy withdraw and organize resistance. They also try to anticipate the enemy by reaching the crossings, seizing them, and holding them until the arrival of the main body of troops. The composition of mobile detachments may vary depending upon the action of the enemy, the mission, and the availability of troops and equipment: it may be a rifle battalion (or company) in troop carriers armed with machine guns, mortars, and artillery, or a tank battalion with some tankborne infantry. The seizure of a crossing may also be made by airborne or parachute forces.

The seizure of crossings determines the methods to be used in forcing the river. In the Vitebsk operations of June 1943, the speed of our advance was so great that the Germans did not have time to demolish two of the bridges over the western Dvina to the south of Vitebsk. A special tank detachment sent forward to capture the bridges managed to drive over the river using these bridges, and this accelerated the breakthrough of the enemy's fortified zone.

Preparation should be started as early as possible. Thus the troops of the First and Second Ukrainian Army Groups received the order to prepare for the crossing when they were about three days east of the Dnieper. In another instance, one of our divisions engaged in pursuit of the Germans was ordered to prepare to cross the Dnieper when the enemy was from forty to eighty kilometers east of the river. All divisions were assigned sectors for establishing bridgeheads, all equipment was properly distributed, while regiments were ordered to cross the river in the most advantageous areas, disregarding all boundary lines in the advance. Following the crossing of the river, when the troops captured the western bank of the Dnieper, all boundary lines were again observed by the units.

When a river is forced without a pause, all preparations are carried out in an accelerated tempo. Command reconnaissance, the assignment of missions, and the organization of cooperation are carried out as fast as possible, and all details are taken care of in the course of the preparation. Haste, however, should not interfere with the thoroughness of the preparation. The attempt to cross the Vistula without halting for the organization of the crossings on the night of 30 July 1944, failed simply because command reconnaissance had not been properly completed and cooperative action had not been organized. As a result, one of the units landed on an island near Sadloviche, having mistaken it for the shore occupied by the enemy, and a company from another battalion reached the other shore but did not receive any artillery support because no artillery observers had been assigned to work with this company.

Missions to be accomplished on the other side, battle formation of the troops participating in the crossings, organization of artillery offensive, and other combat measures, are worked out without going into

detail. Much attention, however, should be given to the organization of the leading detachments since its actions determine the success or failure of the whole operation. In all cases, the primary mission of the leading detachment consists in eliminating hostile artillery observation on the other side of the river and in securing the deployment and crossing of the main body of our troops. The strength of the leading detachment, therefore, should be determined correctly. The wider the river and the stronger the defense of the enemy, the stronger the leading detachment should be. It must be remembered that this detachment operates away from our troops and encounters very stubborn resistance on the part of the enemy. Its strength also depends on the availability of crossing equipment, on whether or not the element of surprise is to be employed, and on the importance of the missions to be accomplished on the hostile side of the river. River crossing operations of 1943-44 showed that the average strength of the leading detachment varied between 150 and 750 men.

The leading detachment is well reinforced and strong enough for both offensive and defensive action. The success of its operations, following the forcing of the crossings, depends upon how quickly and reliably it can organize antitank defense for the captured position. This is not easy, for a sufficient amount of antitank artillery cannot cross with the leading detachment, and artillery, in this case, is substituted for a short period of time by light antitank weapons and sappers with antitank mines. When the river is not very wide, antitank guns can be emplaced on our shore. These and self-propelled artillery guns can thus be used for direct firing upon the tanks of the enemy. When one of our rifle divisions crossed the Dnieper near Voiskovoie, our engineers mined the edge of the entire bridgehead captured by our troops. In

addition to this, they planted three mine fields within the bridgehead. This played an important part in the engagements which followed when the Germans counter-attacked. Their tanks were destroyed not only by our artillery but also by the mines which the Germans did not expect to find within the area.

As a general rule, the leading detachment consists of the following troops: men armed with submachine guns, machine-gun units, mortar crews, antitank artillery, sappers, artillery observers, and signalmen. Besides, it is advisable to have a message center, reconnaissance personnel, and engineers trained in reconnoitering river beds for the construction of bridges. In crossing the Dnieper near Voiskovoie, where the river was 3.5 kilometers wide, the leading detachment of the division had two companies of submachine gunners, one machine-gun company, two engineer battalions, some regimental artillery, and one antitank battalion.

In crossings of this type, rifle units cross over on light boats or rafts (standard equipment or procured locally). In crossing comparatively narrow rivers with slow current, one can utilize very small rafts made of logs, barrels, shelter halves stuffed with hay, etc. For heavy loads it is necessary to build bridges or large ferries.

The protection of troops on our side of the river is one of the most important measures in the success of the operation. For this purpose, our troops use special advance guards, operating in the proximity of the river. In preparing for a river crossing one should not overlook the fact that the enemy is apt to organize a similar operation of his own in order to stop the advance. In 1942, the Hungarian Seventh Infantry Division pressed back our units south of Voronezh and compelled one of our divisions to leave, the western side of the river. The Hungarians then began

preparing to force a crossing of the Don in order to continue their advance to the east. But our division, having regrouped its forces on 4 August, on 6 August crossed the Don and captured the bridgehead, thus upsetting the plans of the enemy.

Antiaircraft defense is organized in the usual manner. During the fighting on the enemy's side of the river our pursuit aviation and antiaircraft artillery covers the crossings, chiefly since the enemy always tries to isolate the troops already crossed over.

As a general rule, the forcing of a crossing should start after a thorough neutralization of the enemy's defenses. It commences under the cover of artillery fires and aircraft. If the hostile fire system cannot be completely neutralized, the

crossing should be started at night and without artillery preparation. In actual practice, our leading detachments usually crossed over at night, when limited visibility affected the accuracy of hostile fires. If the first attempt to force a crossing fails, then a well planned preparation for another crossing is undertaken, but even here the commander has to decide whether to consume much time for the preparation of another operation or get ready within a short period of time in order to prevent the enemy from organizing a formidable position.

It is felt that the study of our war lessons should help all the commanders to accomplish this type of crossing without much difficulty.

Ships Armed with Planes, and Jet-Propelled Aircraft

Translated and digested at the Command and Staff College from a French article by Pierre Belleruche in "Revue de Défense Nationale" (France) April 1946.

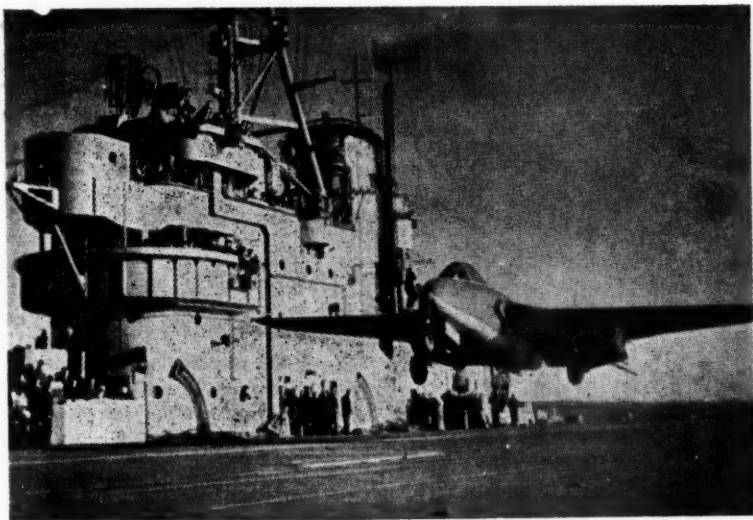
THE successful take-off and landing, on 3 December 1945, of a De Haviland Vampire jet-propelled plane aboard the small 14,000-ton British airplane carrier, *Ocean*, is an event whose importance merits special attention for in it we find synthesized the double revolution that has taken place on the seas and in the air in the development of the airplane carrier and the jet-propelled plane. The ship armed with planes came into being at the end of World War I, but it required twenty-five years for the fact to become clearly apparent. The jet-propelled plane was born at the end of World War II, which came to a close before this new weapon was able to establish its position, but its reign is none the less certain.

It is the rise of the airplane carrier which has established the supremacy of the American navy over all others, just as

three centuries ago the development of the vessel armed with guns marked the debut of British supremacy on the seas. Toward the end of the Sixteenth Century, it was the English sailors who were the first to learn of the advantage to be gained from sailing vessels armed with guns arranged in parallel fashion along the sides of a vessel in order to insure concentration in broadside fire. Throughout the three centuries that followed, the supremacy of Great Britain on the seas continued to be based on her superiority in the matter of ships armed with cannon. The supremacy of the cannon as a naval weapon continued throughout the entire evolution of the platform on which it was mounted: screw propulsion in place of sails, iron construction, armor, and the disposition of the guns themselves in rotary turrets.

Then the flying machine made its appearance and the ship armed with planes appeared in 1917 with the transformation of the *Furious*, in which one turret was replaced with a small flight deck. On 7 August 1917, the first landing of a plane fitted with wheels on the flying deck of a battle cruiser in motion took place. It was clearly seen that the war vessel with a flight deck and planes carrying bombs

ten the range of the largest present day guns. The supremacy of the ship armed with planes is now undisputed—unless disagreement be the result of sheer force of habit. It is possible that the airplane carrier of tomorrow will make use of planes without pilots or of flying projectiles controlled at a distance by piloted planes. This fact will not in the least affect the supremacy now enjoyed by surface vessels



"Vampire" leaving *HMS Ocean*.

or torpedoes was to outclass the vessel with turrets firing artillery projectiles. It was necessary, however, to wait till 1942 for real naval battles to be fought on the basis of attacks by planes, and no longer at the range of cannon, but at that of carrier based planes. The battles of the Coral Sea and Midway Island mark the advent of the airplane carrying ship as a combat vessel. It took the gun four centuries to multiply its range by ten, but the airplane immediately multiplied by

armed with planes. And now a new thing, aircraft propelled by reaction, comes in to confirm the supremacy of the air-sea formula.

Having scarcely reached the fortieth year of its existence, the plane is now undergoing a transformation in its means of propulsion which is without equal in history, except for the change from sail to steam propulsion of the last century. The plane is changing over from propeller to jet-motor propulsion. Its flying speed

had appeared to be limited by the peripheral speed of the propeller blades, which were bordering on the speed of sound. With the advent of the jet motor, the plane has at last found a method of propulsion all its own which, tomorrow, will permit it to pass through the "wall" created by the speed of sound and penetrate into the unknown realm of supersonic speeds.

We must face facts squarely. Whether this upsets our routine habits or not, the air screw is dying just as in the last century, the sail-powered navy died with the advent of the water propeller, so the ship armed with cannon is dying with the advent of the ship armed with planes. The complexity of the fourteen, eighteen,

twenty-eight, or thirty-six cylinder airplane motor is doomed to be a thing of the past in the face of the simplicity of the gas turbine with the single rotor. By virtue of its capabilities, the jet plane will be the indisputable master of the skies, in which the propeller-driven plane will appear like a schooner, or a three-master with topgallants and royal sails in comparison with modern war vessels. The propeller-driven plane cannot compete in speed with the jet-propelled plane, and the ship armed with guns cannot measure up to the ship armed with planes. This double revolution in naval and aerial technique conditions the structure, not of the navies of tomorrow, but of those of the present day. Armed with jet-propelled planes, the airplane carrier is supreme.

The Tamu-Kalewa Road

Digested at the Command and Staff College from an article by Brigadier P. O. G. Wakeham, in "The Royal Engineers Journal" (Great Britain) September 1946.

THE maintenance of Fourteenth Army during the Burma Campaign 1944-45, over one single land route from Calcutta to the advanced base at Myingyan (the longest supply route in any theater) was one of the finest achievements in Southeast Asia; not the least remarkable feature of which was the construction of a road from Tamu to the transit center at Kalewa, on the Chindwin, through ninety-four miles of largely untouched territory, using a novel method of construction to overcome the limitations of time, resources and transport.

For some years past this area has been the scene of various abortive attempts at road construction. Before the war, there was a 9-foot metalled road from Kalewa to Kalemmyo and in 1929 a track was surveyed from there north to Tamu, but work was not preceded with and refugees in 1942 followed the bullock tracks which

connect villages in the valley areas. Further attempts followed and in spring 1944, General Reserve Engineer Force (Gref) had cleared and levelled some ten miles of a new alignment; but on the advance of the Japs towards Imphal this also was abandoned and it was not until after the Monsoon Campaign in 1944 that a start could be made in earnest.

In October and November 1944, the Japanese 33d Division was pursued from Tamu down the Kabaw Valley to Kalemmyo; by mid-October the single fair-weather track south was a morass and our forward division was on air supply. As the monsoon rain ceased another fair-weather road was cut forward through the jungle, at some four miles per day, to carry the supporting division, and this rapidly became the sole road for Fourteenth Army, carrying up to 3,000 vehicles per day. Meanwhile there was an immediate requirement

for a double way, all-weather, heavy service road to deal with the maintenance commitments for 1945. In October 1944, an advanced headquarters was established near Tamu to put this work in hand.

Planning

The area between Tamu and Kalewa falls into two distinct topographical sections—the northern from Tamu to Kyigon (seventy-six miles), near Kalembo, comprises the Kabaw Valley sector; from Kyigon to Kalewa runs the Myittha Gorge, and the "Gorge Road." The Kabaw Valley is covered largely by heavy teak forest with a close knit jungle undergrowth and few clearings, what paddy fields there are being mostly overgrown. To the south there is a heavy growth of tall bamboo. The gorge by contrast is a narrow valley seldom wider than 400 yards and up to 1,000 feet deep. At the Kyigon (west) end it is cut through soft sandstone which grows progressively harder towards the east—hence the vegetation grows sparser and the gorge narrower and more rocky until the Myittha-Chindwin confluence at which Kalewa stands. The climate in the area is typically monsoon. March to mid-May is dry and hot; mid-May to mid-October rainy (especially June to September when up to 100 inches of rain fall) and the remainder of the year is dry and comparatively cool.

The specifications called for a class 70 two-way route which should be capable of an average of 350 tons per day in the monsoon period and be ready before its onset, estimated for 15 May. With existing limitations of manpower and machinery any orthodox pavement type of road was clearly out of the question, and soil stabilization as normally understood (involving the skilled admixture of selected material to the formation, followed by a surfacing of tarmacadam) seemed equally impracticable. Accordingly it was decided to employ a method hitherto untried in

road construction practice which may be termed, "Compaction and waterproofing." This method, which had previously met with considerable success in airfield strip construction, consists in consolidating a graded formation at its most suitable moisture content and then preserving this condition by a waterproof and airtight seal of prefabricated bituminous surfacing (PBS)—a bitumen impregnated hessian fabric. It is the initial employment of this method on so large and important a project which gives the Tamu-Kalewa road its unique interest.

The initial engineer appreciation was made off the one inch map while the territory was in Jap hands. Ground reconnaissance extended over October and November 1944. Owing to lack of information about flood heights it was attempted to keep the road ten feet above the plain level—on this basis river crossings were selected and adjusted on the ground.

The bridging and culverting requirements were then computed. In all, 145 bridges were needed which were designed variously in Stock Span, Hamilton and Bailey equipment to class 70 one-way specification throughout. Piers and abutments were, for the most part, to be of mass concrete, going down to six feet below stream bed level or until a firm foundation could be reached. The span design was in no case spectacular, the longest being the 140-foot triple-triple Bailey at Tamu. The bridge of greatest overall length was the 240-foot, 3-span Bailey, at Htinzin.

In addition numerous culverts were sited for construction with corrugated iron rounds in 6-inch concrete. Work commenced on the road in December 1944.

Kabaw Valley Sector

The bearing capacity of a cohesive soil depends upon two entirely separate factors; the inherent stability (physical grading) of the soil, which comprises all varieties and mixtures from sands to fat

clay; and the moisture content, which can modify any such soil from dust through firm soil to mud. Normal soil stabilization implies control of the former factor (grading) by the admixture of a carefully graded complementary fill to the formation, thus ensuring a sufficient bearing capacity over a reasonable range of moisture conditions. The alternative method accepts the soil as it stands and aims at controlling the moisture content at its most advantageous figure (i.e., that quantity of water which results in the soil compacting to its maximum density when consolidated—known as its optimum moisture content). This may be done, within a limited class of soils, by the careful addition of water-repellent chemicals. The novel method of external sealing projected for the Kabaw Valley road gave promise of stabilizing a far wider range.

Mechanical equipment was used at all stages in the foundation work. Four or five dozers would be engaged in clearing the 100-foot tract assisted by explosives on all trees greater than twelve inches in diameter. Trees and undergrowth were dozed to one side and four more dozers followed to strip the vegetable soil from the surface accompanied by pioneers removing roots and shattered stumps, etc. Earthwork (cut and fill) was done by both scrapers and dozers. Compaction was carried out by sheepfoot rollers; tractors and scrapers do not produce satisfactory compaction for this type of construction, and as it was, only the top six inches of an 18-inch layer could be adequately consolidated. Owing to an initial shortage of tractors these rollers were towed behind scrapers thereby slowing down the earth moving operation. It is recommended that one roller (plus prime mover) be employed for every scraper used—carelessness in compaction is paid for many times over in maintenance requirement. Cambering and drain cutting was done by auto-patrols; main drainage by dozers and scrap-

ers and final compaction by 10-ton smooth rollers. Elephants gave very useful service throughout in handling timber where mechanical plant could not be employed.

The PBS used was of Indian manufacture supplied in thirty-five yard rolls of thirty-two inch width. It was overlapped to double thickness on the carriage-way; single thickness on the berms and cut-offs. Laying was done by hand throughout; following some two days behind the earthwork and rolling parties to allow for hardening after compaction.

The 22-foot 6-inch carriage-way required a mat of seventeen strips of PBS, each mat covering 100-foot lengths. A two days' task was set at a time, half the width being laid each day. The day before laying, PBS was dumped along the track, seventeen strips per 100 feet, and the carriage-way edges set out, from the center line pegs, in telephone wire.

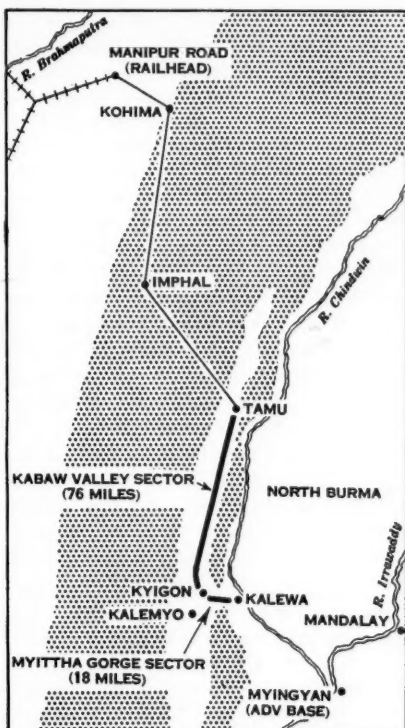
On the first day eight strips were unrolled and laid in the sun, wearing side downwards, over the full width of the road, for fluxing. When the sun had eased the kinks and softened the fabric, solvent was sprayed on and spread evenly by hessian mops on bamboos. When the sheets were fluxed, the first sheet was aligned along the carriage-way edge and successive sheets were positioned by measuring sticks and lapped like the tiles on a roof. Each sheet was tensioned longitudinally to ensure that it lay without rucking. On the following day the other nine sheets were laid; the last being placed as a ridge tile down the center line of the carriage-way. Subsequently four more strips were laid as wheel tracks and the whole given an anti-skid dressing. Corners of radius greater than 200 feet were easily dealt with by laying the strips along the curved alignment; for sharper curves they were cut into ten to fifteen yard lengths and lapped.

Berms and cut-offs were sealed with prefabricated mats of three strips of PBS

laid longitudinally. These were lapped under the outer strip of the carriageway mat and sunk into thin eighteen inch cut-off trenches dug at the bottom of the side-drains. On the high bunds however, it was necessary to lay the strips transversely owing to looseness of the surface. Sealing the whole of high bunds was well worth while since it allowed the dry angle of repose to be used and prevented scouring under heavy rainfall. Since berms were sealed with single thickness, carriage-way markers were erected to ensure that they were used for parking only and not for overtaking.

The Kabaw Valley road was opened as far as Kyigon by mid-April. Though this was too late for the road to be completed through to Kalewa by 15 May, there is no doubt that had the estimated resources been made available the target date would have been achieved. The road immediately came under heavy traffic, the average for May was 1,000 vehicles per day with peaks of 2,700.

Failures occurred at various points along the road as a result of faulty construction (mostly due to haste). For example, vegetable soil had been left in the formation along certain stretches of road where a 6-inch cut had been adopted instead of the original two feet bund. This was inevitable, as in virgin forest humus extends down to a depth of eighteen inches, and as a result trouble was encountered sometimes within a fortnight of laying. This was remedied by rolling back PBS (replacing it if damaged), excavating all humus, roots and rocks, back-filling with four inch hand rammed layers of selected fill combering and relaying PBS. Carelessness with the moisture content on compaction also necessitates lifting PBS and either permitting the formation to dry out or, if it is too dry, thoroughly mixing in water with harrows or mix-in-place machinery before reconsolidating. Faulty sealing was due



Tamu-Kalewa Road.

chiefly to manufacturing faults in the PBS and could usually be spotted and remedied before serious damage was done. Insufficient cross drainage, however, can be far more serious; in one place 100 yards of bund was washed out for this reason and necessitated complete realignment for that section; and in other places culverting was insufficient.

Eleven Pioneer companies and one Road Construction company have been employed on maintenance continually since the road was opened. As a result of their efforts the road has taken, during the monsoon, nearly twice the target figure of 350 tons per day up to the time of writing.

The Gorge Road

Work was not started upon the Myittha Gorge section of the road in earnest, until mid-April; a fact which was most unfortunate for a number of reasons. Line of communications requirements demanded continual use of the existing road, by now reduced by ourselves and the Japs to a dustbound switchback pitted with eighteen-inch potholes and bereft of even the most rudimentary drainage. But under the circumstances no alternative alignment was feasible for the all-weather road, which had accordingly to be constructed from scratch on an alignment which the traffic continued to employ. Moreover the rains were imminent and monsoon rain conditions make construction virtually impossible. Moisture content cannot be controlled, rain and mud inhibit sealing of PBS, and mechanical equipment moving over soil above its plastic limit does far more harm than good.

For both reasons it was decided that the specifications for this section would

be stone rather than PBS. Soling and metalling can be placed and rolled under monsoon rain and will permit the passage of traffic during construction. The quarrying and importation of 75,000 tons of stone for this eighteen mile stretch (as against 14,000 tons of surfacing for the seventy-six miles of Kabaw Valley road) was a commitment which was inevitably accepted. By the end of April it was clear that the target date of completion would have to be postponed by two and one-half months and soling of the Gorge Road was not in fact completed until 1 August, while even then a very heavy maintenance commitment remained.

Nevertheless the road was a success in that it continued to transmit the required tonnage of stores. This was achieved by opening the road to construction and traffic in alternative twelve-hour periods. Otherwise no problems of special engineer interest have arisen out of the Gorge Road sector; its working remains a tribute to routine maintenance methods under extremely difficult circumstances.

Doctrine of War and Methods of Action

Translated and digested at the Command and Staff College from an article in Portuguese by Colonel J. B. Magalhaes in "A Defesa Nacional" (Brazil) October 1944.

WHAT happened in France in 1940 has happened and will happen in all wars in which new elements, which are not well known, come into play. Moreover, the beginning of any war, particularly when preceded by a long period of peace, always differs from peacetime expectations, for in peacetime it is impossible to anticipate accurately the reactions of an enemy. In wartime there is but one fixed thing: the result one desires to obtain.

What was the chief error in the French doctrine? It was merely the fact that main consideration was not given to new

means. It lay in having stubbornly considered as the most usual thing that which, in Europe, was in truth but sporadic or secondary; and in having left in second place, that which really proved to be the rule.

Was the German doctrine, which based everything on panzer warfare and which gave preponderance at all times to panzer methods, the correct doctrine? Events in Russia proved the contrary, as did the last events of this war, even considering the European theater alone.

From the standpoint of doctrine, it was

the Russians who had best conceived of the war of the future. In 1941 they appeared to have a serious deficiency. They seemed to lack what was the basis of the outstanding German successes. This was no doctrinal error, but rather an inadequate application of their doctrine. They had always conceived of war as waged and won by the coordinated effort of all means which fact guided them in the organization of their forces. But in spite of this, in their distribution of new means (tanks and planes) among their fighting units, they lacked the wisdom to hold back sufficient quantities of main reserves to reinforce the most vital zones of action in such a way as to possess preponderance over the enemy at the decisive moment. Their large mechanized units were not self-contained, but belonged to their armies. The result of this was that, although they possessed numerical superiority to the Germans, never in the course of 1941 were they able to meet the panzer attacks of the Germans with sufficient means. But with this error corrected and with the aid of the Anglo-American industrial resources, the war changed its course in 1942 without the Russian's having abandoned their methods of action i.e., the coordinated effort of all arms, including even horse cavalry. In 1943, having stopped the counteroffensive which the Germans had unleashed at Orel, they began an advance which took them to the Elbe and Berlin. Never did they put their trust in wedge operations of too great depth. They always took the pains to readjust their fronts.

The principles pertaining to the establishment of contact, engagement, attack, etc., set forth in the French regulations are still correct, even with the new means. Methods, however, differ when these new means are employed.

In war, it is not new means only that are employed. Wars are not fought with new weapons alone; the old ones are still

employed. Speed, surprise, blitz attack and so on, are nothing new. They are found in all campaigns conducted by the masters of warfare. All strove continually to obtain maximum power in attack, to surpass the enemy in speed, to surprise him, and to obtain new means capable of giving better results in these efforts.

Speed does not eliminate the necessity for security. The rule which establishes a relationship between front of attack and depth of penetration, and its great significance from the standpoint of security, does not appear to be invalid. Why the relationship between front and depth of attack? For reasons of security. This antiquated rule cannot be violated, even today, unless the attacker possesses reserves of sufficient strength to prevent the closing of the gap at the base of the wedge that has been driven into the enemy's disposition, or when the latter lacks the capacity for counterattacking the flanks of the wedge. What would have happened to the American army of General Bradley in its rapid advance to the Loire if Montgomery had not been able to hold his positions firmly in the Caen and Falaise areas and if he had not possessed reserves capable of frustrating von Kluge's counterattacks?

An attack cannot be extended too far from its base. It must be stopped until supporting elements catch up. It is merely a question of judgment when the distances have grown too great. Attacks, even with mechanized forces have to be stopped from time to time while lines are adjusted and until supplies catch up.

Even in cases where the panzer force encounters resistance it is not able to overcome alone, such as Stalingrad, El Alamein, the Mareth line, and the Atlantic Coast, it is necessary to establish powerful, fixed bases of fire and support the infantry while it overcomes them either with, or without armor. In the reality of this war, rapid dashes were made only after the

defense had been broken in its entire depth.

Attack of an adversary, who is capable of reacting either in the strategic or in the tactical field of operations, without having one's flanks covered either by prompt intervention of reserves or by correct proportion between depth of penetration and width of breach, may lead to the most disastrous consequences. In this connection let us note what occurred in Russia in the summer of 1942. The German wedge, resting one side on the sea, but with its left flank open, met with nothing but disaster in its race for the Caucasus because of the fact that neither Voronez nor Stalingrad had been conquered.

Speed, surprise, and economy of force, are of the same importance in present day warfare as in that of all times. War, essentially, never changes. The principles which govern it are the same. But it is quite obvious that we must make use of these principles with the full consciousness of the means at our disposal.

What is a doctrine of war? It is the reasoning which is capable of analyzing the factors of any situation of war: mission; terrain; the enemy; and the means to accomplish what one desires. These are the basic factors. All else is a matter of interpretation and of art, depending on the capacity of men for judgment and on their natural aptitudes which have been judiciously cultivated by meditation and practice.

Doctrine of war! Of what does it treat? Of those things that Alexander, Hannibal, Caesar, Frederick, Napoleon, Foch and Eisenhower did. To employ the means at one's disposal for the attainment of the desired ends, in such a way that the results of one's action will be additive, is what wars teach us. Economy of force has always been practiced. It was what the French attempted to practice before 1940, but they experienced enormous, insuperable difficulties in carrying out their

intentions. There was a certain leaning toward the old formulae notwithstanding the clear evidence by certain minds who fought for certain radical reforms of old methods.

And why this? There are many reasons, among which is the slight depth of the French territory and the great radius of action of the powerful, modern means of attack. The French were not able, or lacked the wisdom to see that the depth of the terrain at their disposal was insufficient for their maneuvers. The range of modern attacks and the breakthrough capacity of the new weapons, necessitate maneuver of great depth, a fact which the Russians perceived with the greatest clarity. The alternative is the accumulation on the frontier of all means, for the defense of the country.

Those nations which possess no depth, are obliged to develop their maximum potentiality instantaneously, and if their adversary is powerful, they have as their sole, positive recourse, offensive action for the avoidance of rapid defeat. But offensive action requires superiority of means and must be constantly fed till final, complete victory has been won. This was the case of France against a Germany who had prepared herself extensively and down to the most minute detail, for war.

The only salvation for France was a war conceived and prepared on the basis of the French empire and solid alliances; a war which the French mind and French policies could not see the need for or accept, even in the face of facts, a thing attested to in her capitulation. The weakness of the French, a weakness which also is shared by many other nations, was their unwillingness to accept facts as they were and their attempt to solve the problem of war in an artificial manner, distorting in their application, the principles of the doctrines they adopt.

World War I taught a lesson of capital importance;—the decision belongs to the

greatest industrial power—which, in turn, depends on coal and iron. If the French and other nations had perceived this clearly and had compared their possibilities in this respect with those of Germany, they would have joined themselves solidly with Great Britain and Russia, forming a military system of solid structure. Military strength does not reside in nationalism; it is today a result of geology. Nationalism, patriotism, and all other things which constitute the moral strength of a nation, are precious elements of imparting worth to the products of mine and factory.

We must distinguish carefully between doctrines of war and methods of action, the concept from its application. The doctrine is not French, it is not Russian, it is not German. There is but one doctrine, it is universal and it is found in history. It is the application of this doctrine that differs in accordance with geography, geology, with climate, and the

possibilities of each and, above all else, in accordance with the intelligence and the ability to assimilate the doctrine.

There exist in these modern times, two typical examples of perfect assimilation of the doctrine: the Russian and the American. The first formulated their concept of war after an analysis of history, and the second by constant study of the masters of past wars and by ceaseless edit of the works of antiquity.

War is a human social phenomenon whose physiognomy varies with the stage of civilization. In order to understand it well and to be able to march boldly through the future which constitutes to an increasing extent an unknown, it is necessary to be able to discern this physiognomy in each age and to be able to perceive the why of this physiognomy, separating that which is permanent from that which is passing.

Should We Study World War II?

Translated and digested at the Command and Staff College from a French article by Colonel Chassin in "Revue de Défense Nationale" (France) April 1946.

It is not unusual to hear it said today, in certain military circles, that it is absolutely useless to study the history of World War II. This theory is based on the fact that during the six years of fighting, the belligerents made use, almost exclusively, of "classical" matériel: tanks, guns, machine guns, planes, submarines, battleships, carriers. It was only at the very end that "revolutionary" weapons: jet-planes, remote-controlled equipment and, finally the atomic bomb, appeared. For various reasons, the belligerents hardly had the opportunity to use these newer weapons. As regards the future, therefore, we are reduced to the expedience of con-

jectures. The study of a war conducted with wholly antiquated matériel would be a waste of time.

Regarded from another point of view, however, there are able theoreticians who contend that the laws of warfare are eternal. Although the weapons employed in various wars may be completely changed, the principles of strategy or tactics are still of value.

As a matter of fact the employment of arms has always required the raising of more or less organized armies whose evolution may be easily traced through history. In all the struggles between armies, whatever their importance, the art of war

has always been based on a certain number of "principles." Naturally these have been presented in different manners. In the case of Marshal Foch, four of these principles sufficed: economy of forces, freedom of action, freedom of disposition of forces, and security. Certain modern military writers raise the number to nine: pursuit of a single objective, priority in offensive action, concentration, mobility, surprise, cooperation, economy of forces, security, simplicity. In the case of others everything may be summed up in a single rule which contains all the others: The insuring of maximum forces for the decisive battle.

Whatever the discussion along these lines may be, it is entirely accurate to say that the principles of the art of war are eternal.

As long as armies are required it will be necessary to train army officers who will be fully imbued with these principles, and it is because of this that the study of the last war will be particularly fruitful, even if it is admitted that the weapons that were employed in it were definitely obsolete.

There is another aspect of the problem that is of still greater importance. The main preoccupation of the general staff, charged with the protection of the nation, is to determine what the form of tomorrow's conflict will be, what weapons will be employed in it, what method of warfare will be followed. In order to be able to see accurately into the future, all we need to do is study the past. There is never really any revolution in the art of war. It is only necessary for those on whom the responsibility falls to prolong the curve in the proper direction. That made by the French in 1914-1918 had led to the defense doctrine as expressed in the Maginot line, while that made by the Germans led to armored divisions supported by Stukas. The Germans, in this case, had obtained the correct vision and vic-

tory was the reward for their correct estimate of the direction of the curve. The problem presents itself in the same form today. It is absolutely necessary to study the past carefully in order to discover there, the germs of future trends.

Wintringham attempted to deduce the general laws of the evolution of methods of warfare. He calls attention to the fact that three times in a thousand years, armed forces have crossed the Meuse at Sedan. The first time they marched on foot, the second time on horseback, the third time in tanks. His study led him to divide military history into six alternating periods, three of them characterized by the absence of armor, the other three by the presence of armed forces.

The "armored" periods are characterized by the creation of a shock instrument: the phalanx, the legion, or the armored division, striking like a hammer by means of "shock" weapons: pignards, pikes, lances, bayonets, or short-range guns. In the face of this irresistible attack, the defense becomes more and more mobile, and assumes greater depth and less density. The armor then seeks greater suppleness and becomes an auxiliary to the other arms. Little by little these light weapons assumed greater importance and the armored arm, which had been too cumbersome, its effectiveness gone, disappeared for a time. It reappeared when it found the means, through the acquisition of speed and the perfection of its armor, for passing through the defense network of the hostile weapons.

In the evolution of war we also discover "constants." The increase in the radius of action of weapons is one of them, but it is to be noted that this did not prevent the soldiers of World War I from engaging in hand-to-hand combat. Another "constant" is the continual evolution in the direction of greater mobility on the part of the organized forces. A third, is the evolution in the direction of a continual

augmentation of the destructive power of projectiles. A fourth, and one which is much more important, shows us that each new offensive weapon will automatically bring about a new defensive weapon.

The appearance of firearms, and that of aviation, certainly constituted turning points in military history and there is no doubt that the advent of the atomic bomb will constitute a third, which is more important still.

Other writers have divided history in another manner. General Fuller perceives in it, periods characterized by shock weapons, and periods characterized by ballistic weapons. However, he asks whether war is not, after all, mainly a matter of armament, and, convinced of the capital importance of the latter in a era of scientific research such as ours, he declares that where effective weapons are discovered, they constitute ninety-nine per cent of what is required for victory. Strategy, command, courage, discipline, organization, and all the moral and physical accessories of war are nothing alongside great superiority of armament. It is the machine and not the man that will win the war.

We may reply that the "constant tactical factor" will intervene some day or other to neutralize the effects of technical surprise, and that moreover, no technical surprise (with the exception of the uranium bomb), ever brought about a decisive victory. The human factors are always important. It is true, however, that the industrial period in which we are living is causing a considerable acceleration in the evolution of forms of warfare.

Considered merely as a shock weapon, the German panzer division failed in the first Russian campaign. Secondary weapons reappeared — artillery and aviation above all. In October 1942 at El Alamein, there occurred another failure on the part of armor, this time because of mines. It was the infantry which made the hole in

the enemy lines in order to permit exploitation by the tanks. Later, in France, we see aviation playing a leading role in the breakthrough at Avranches and in the stopping of Rommel's counteroffensive, as well as at Aachen, on the Sarre, and in the Ardennes.

Though the tank remained one of the dominant weapons of World War II, can it not be declared that the hour of its decline has arrived? Indeed, the advent of the hollow charge and of very high power explosives calls for vehicles with armor of enormous strength which, if built with adequate armament and provided with sufficient personnel would constitute monsters with neither mobility nor speed, twin brothers of the mail-clad knight, incapable of rising to his feet if he ever fell from his robust steed.

It seems, therefore, that we have arrived at the eve of the end of the third "armored" period. It is now our task to discover what the secondary weapon is that will dethrone the tank, lord of the last battles. As always, ballistic weapons will follow after shock weapons. These ballistic weapons may be of two sorts: first, bombs dropped from the air by planes with or without pilots; second, missiles in the form of very long range bombs hurled directly from one territory to another, even across oceans. The defense principle followed in the case of a dangerous weapon (such as aviation), consists in exacting from the attacker so high a toll of losses that the latter will discontinue his action. Now, in the present case, the problem is complicated by the fact that the effects of the new projectiles are incomparably greater than any that we have heretofore known. Hiroshima and Nagasaki are the evident proofs of it, since they probably saved the Americans an invasion and a year of war. We have here a new fact which will obviously upset all present strategic conceptions of national defense and lead us to a revision of our usual

types of conceptions of national defense.

What means of defense can be used against the atomic bomb? Preparation for it, and the dispersion of the population of large cities and of industries should be the first preoccupation of the governments. The Germans had worked a great deal along this line—and they had only conventional bombs of a maximum of ten tons' weight to contend with. The atomic bomb will remain, at least for some time, a costly and relatively scarce weapon. It will not pay except on objectives such as Paris, London, or Moscow. In the case of cities of 30,000 or less, its use would not be warranted. Going underground, in the case of key industries, is the second necessity. A barrier of a few dozen meters of earth will be, for a long time yet, the best defense against even an atomic explosion. This again, is a course the Germans had started to follow. We must learn to install all assembly works underground. Lastly, the employment of uranium requires an extremely reliable intelligence system and the possibility of immediate reprisal. The enemy that is able to act by surprise will possess a very great initial advantage if the measures of dispersion have not been taken with sufficient speed. Now, unless he stakes everything on one play, the enemy will proceed to carry out his own dispersion before launching his attack. This will be the new "mobilization." It must be carried out in time, otherwise it will spell disaster.

Is the appearance of modern weapons going to lead to the elimination of armies? This is the question which will solve the problem stated at the beginning of this article, the principles of war being applicable only where there are armies to be led into battle. Let us note that it is not at all certain that future belligerents will make use of the uranium bomb. During the last war they neither made use of chemical nor bacteriological warfare. As soon as each is aware that his enemy is

able to make use of the same method, he will think twice before he starts fighting. Hitler did not make use of gas, though he was sure of air superiority in 1940.

The reason there will always be a need for armed forces is that there is little likelihood that the decision can be obtained by the use of new weapons exclusively. Some nations are capable of resisting even after the destruction of their principle cities. Moreover, belligerents without organized forces and in possession only of the new weapons would find themselves in the situation of the two fortresses, each attempting to destroy the other by means of artillery fire. It is finally necessary for one of them to go on foot and end the attack. For—and we arrive here at a second and most important point—no matter what the means may be with which we conquer the enemy, it will always be necessary to occupy his territory, and this thought justifies the argument for the necessity of armed forces.

We should note, finally, that as soon as one occupies enemy territory and the troops of the attacking country are mixed with the population of the attacked country, the employment of guided missiles becomes very hazardous, and we see then the possibility of maintaining for modernized guerrilla warfare an important complementary place in military operations.

It is certain, indeed, that guerrilla warfare has acquired in Russia and China a place of considerable importance. The threat suffered by the German and Japanese rears, the continual cutting of communications routes, the precious information transmitted to the Russian and Chinese general staffs, the ambushes and surprise attacks at the moment of their own attacks, accelerated the defeat of the Axis powers. Tomorrow, the development of aerial transportation may still further perfect this guerrilla action.

At the present time the transportation of intelligence agents and the dropping

of arms and ammunition have been perfected. Already, light tanks can be carried by freight carrying planes and tomorrow the transportation of entire combat units and heavy matériel will have become commonplace.

Guerrilla operations will have to be conducted by a population which, during the course of its military service, will have been instructed and will have received the necessary training in such operations—the study of camouflage, marching in small groups, dispersion and rapid assembly, employment of the terrain, and close combat methods. All of these are things found in the military instruction given to “commandos.”

In addition to defense, it is necessary to know how to maintain possession of a country in which the entire population is trained in guerrilla methods. It is in

the Russian armies that we are able to find the solution to this problem. The Russian army that invaded Germany was, in fact, composed of two very distinct types of units: first, combat units—combinations of infantry, and sometimes cavalry, supported by powerful aviation—then, innumerable partisan formations charged with the task of carrying on “counter-guerrilla” operations.

Hence, whatever be the destructive power of the weapons we possess, there will always be a necessity for organized forces on land, on the sea, and in the air. Thus, to a soldier, preparation for the future signifies a study of the past. Those who desire to become military leaders should pour over the old texts as well as over the more recent ones, and finally, of course, one should study the last world conflict.

Consolidation of Captured Terrain Lines in Offensive Operations

Translated and digested at the Command and Staff College from a Russian article by Major General N. Ivanov in “Krasnaia Zvezda” (U.S.S.R.) 28 March 1946.

THE war just concluded demonstrated the importance of quick and efficient consolidation of terrain lines occupied in the process of attack, for the purpose of using them as departure areas for further offensive operations.

Organization of the ground is most difficult when the enemy becomes active, and when the attacker has not had enough time to complete all necessary preparations for defensive action. Under the circumstances, it has to be carried out under continuous hostile fire and while repelling counterattacks.

Combat experience has shown that first on the list of measures is the organization of a barrage, or barrages, made up of artillery, mortar, and machine-gun fires. Furthermore, it is imperative to move forward all available artillery suitable for combatting hostile tanks, and to organize

a reliable antitank defense. For this purpose, the artillery, mortars, and ammunition are brought forward, and a system of standing barrages is worked out for all important sectors. When a sufficient amount of ammunition is available, it is advisable to start firing immediately three or five minute concentrations upon hostile infantry assembly areas, tanks, self-propelled guns, and upon the terrain lines from which counterattacks are likely to originate. Employing these tactics, it is possible to stop all the attempts of the enemy to counterattack before the attacker has completed the organization of his position.

Another important measure is the reorganization of the units that have suffered losses because of hostile fires and counterattacks. This is done under cover of artillery and mortar fires. When all the units are assembled in areas convenient

for this purpose—in draws, groves, etc.—all commanders who have become casualties are replaced and all units are thoroughly reorganized and resupplied with ammunition. In the meantime, sappers, reserves, and second echelons are moved forward to the captured terrain lines, and continue to fortify the new position together with the troops of the first echelon.

At first, the infantry entrenches where it is stopped by the fire or counterattacks of the enemy, for at this time it is impossible to choose or find an advantageous location for the main line of resistance. As a general rule, these temporary positions are far from being desirable. A considerable part of the infantrymen trying to find cover from enemy fires dig in on the back slopes of hills with no observation or visibility for conducting fires, for the commanders cannot select the most advantageous location for the position while under strong hostile fire.

It should be remembered that under such circumstances the enemy always occupies the most advantageous terrain lines. It is natural, then, that the attacking infantry stopped by the enemy in such a position often finds itself below the enemy, in various draws or on the slopes of hills. To prevent this, the commanders of squads, platoons, companies, and battalions should order all their men forward without waiting for any special orders from their superior commanders in order to secure good observation and fields of fire in front of this temporary main line of resistance. As soon as the enemy is made less active by our artillery and mortar fires, unit commanders find an advantageous location for the forward edge of the position and report this through channels. If the pause in the attack, judging by the situation, is expected to be a long one and if there are signs of changing to defensive action, this is one of the most important duties of the commanders. In certain areas, the main line of resistance is chosen somewhat

behind the line held by the infantry and runs along the line already passed by the unit. May the commanders of squads, platoons, companies, and battalions decide, by themselves, whether or not their unit should be pulled back to the new line of resistance? The answer is: *Under no circumstances!* The new line of resistance chosen by the commanders should immediately be reported through channels, but the manning of the new position can be done only upon the receipt of orders from higher commanders. Even before the receipt of the orders, it is perfectly all right to move some machine guns, anti-tank guns, and reserves, if available, into this position. Why? Simply because lower commanders may think that the situation is too difficult and that the attack cannot be continued. But higher commanders know more of the situation and may have reserves. They are likely to decide to move these troops forward to the terrain lines reached by the infantry in order to continue the attack. Then the temporary position which unit commanders intended to abandon is used as a line of departure for a new attack.

When our infantry is forced to organize the ground following an unsuccessful attack, the most difficult task is to retain it until darkness. When it gets dark, the leading units are reinforced. Sappers are moved forward to mine the approaches, bringing with them equipment and materials for the erection of obstacles and fortifications.

It is interesting to mention in this connection an error often made in combat which is a tendency on the part of some commanders to dispose their units in considerable depth right at the start, and pull out part of their forces as reserves. This should not be done during the first hours or during the first day.

On the contrary, if a new terrain line is ordered to be organized for defense, it will be necessary, as soon as the situa-

tion allows, to move forward all men capable of digging and installing wire entanglements, and all personnel who can plant mines. This includes rear-area men and specialists.

During these first hours, the primary purpose is to set up in front of the main line of resistance a fire plan strong enough to stop the enemy. It is also important to organize quickly an effective antitank and antiaircraft defense and to establish mine fields and obstacles.

For digging the trenches, all resources and personnel should be utilized as efficiently as possible. Not infrequently the men are not told what is to be done and by what time. Some commanders were known to issue the following verbal order: "Consolidate your position," and the men, weary of battle, simply built some sort of cover for their heads and fell asleep. This is naturally erroneous, for at this time it is the duty of all commanders to insist on the proper organization of all activities.

Full-depth trenches for squads and platoons should be dug and ready within three or four hours after the decision to dig in has been made. But this does not finish the job. The separate trenches have to be connected with each other to form the first continuous trench, and this has to be done during the first night, provided the sector and the terrain allow it. It should be remembered that the units of the first echelon cannot be depended upon to do all this work. For this reason, all available manpower should be used for the construction of the first trench.

The organization of work is of great importance. We know of several instances when units sent up from the rear were not assigned any definite sectors for defense or work, but were simply told to help one or another company. Whenever the enemy was active, this "help" was insignificant. To avoid such occurrences, each unit should be given a definite defense

zone and a definite mission. For instance: "Defend such and such sector. Dig a continuous trench 1.2 meters deep from such and such hill to such and such reference point. Plant so many mines and construct a wire fence. Upon completion and acceptance of this work, you are to be replaced by such and such unit."

This definite assignment of mission helps to accelerate the work and to improve its quality. Best results are achieved when all these activities are supervised and checked by the officers of the units which are to occupy this sector. The method was used by the Soviet troops in Eastern Russia and was very successful.

When the first trench is completed, mine fields planted, and wire strung all along the forward edge, reserves and others who can be used for this purpose dig the additional trench, at first one per battalion. This trench serves as a communication trench from the rear to the first trench. It will be used to reinforce the main line of resistance and to maneuver the reserves, all in concealment and without losses. Together with the building of the first trench and the installation of obstacles, intensive work is done in the depth of the position. Here the main task consists of digging in and camouflaging artillery batteries, anti-tank guns, machine guns, and mortars. This must be completed within three or four hours. By daylight all observation and command posts should be ready (for a time without over-head cover). Light over-head cover can be constructed only where the necessary materials for such construction are available. Thus, if the offensive is not to be continued, the troops will be ready to repel hostile attacks.

Another important task is to secure an effective and continuous control of battle. To do this the signalmen are required to dig in all the wires on all the sectors under hostile fires, to utilize all available means for improvised lines, such as

wire entanglements, and to duplicate all important telephone lines by improvised lines installed on low posts. To prevent the enemy from interrupting our telephone conversations, all the lines from the first trench to the headquarters of the regiment should have two wires. If a sufficient amount of wire is available (organic, captured or improvised wire) all infantry forward observers in the first trench (one per company) should be connected with the observation posts of battalion commanders, and battalion observers, with the observation posts of regimental commanders. Forward artillery observers, in addition to telephones, should have their own radios.

A definite system of observation of the enemy and the battlefield is to be set up and checked within not more than three or four hours after the order to dig in has been issued. In this connection, it should be mentioned that all platoons and companies detail forward observers to work in the trenches. They should be supplied with reconnaissance periscopes. Twenty-four hour observation with binoculars, periscopes and stereotubes, is maintained on all observation posts of company, battery, battalion and artillery battalion commanders. All observers keep journals of observation and report immediately all changes and movements within the dispositions of the enemy.

Whether the offensive is to be continued, whether the pause is to last several days only, or the decision is to change to the

defensive, reconnaissance is organized as soon as possible. Its primary purpose is to take prisoners, to learn what hostile units we are facing, availability of resources, etc.

The change from offensive to defensive action may be carried out at any time of day, depending upon the situation. All preparations for raids, therefore, are made either by day or in the evening. One raiding party is supplied by each battalion. If not, regimental scouts may be employed. These raids are carried out in the evening, at night, or shortly before daybreak. The idea is to capture a few prisoners by morning and to learn whether the enemy is preparing an attack and what new units he has brought up to the front.

It is obvious that all important measures in connection with the consolidation of captured positions should be carried out as energetically as possible. Not a minute should be lost, especially at night. No matter how tired the troops may be, they must work without interruption all night. Only by doing so will it be possible to have resistance well organized by the following morning. The troops will be ready to meet hostile counterattacks without yielding a foot of ground and to continue the offensive upon the arrival of reserves and the organization of fires. If, however, it is decided to change to the defensive, the consolidation activities are continued, new obstacles are erected, and a detailed plan of defense is worked out.

British Tanks in World War II

Digested at the Command and Staff College from an article by Cyril Falls in "The Illustrated London News" (Great Britain) 27 July 1946.

WE learned from the Germans before the war that in their experience it took at least three years to form and train an efficient armored division. When you come

down to essentials, the most notable feature of tank production is its cost, which is so high that no country is likely to budget in time of peace for more than a

nucleus of the tanks which it is likely to need in time of war. Even Germany did not do so, though she went over to what has been described as a war footing in time of peace. What she did was to equip her armored forces—still very small by comparison with what they were to become—with light tanks and a handful of cruisers. The important thing was that the cruiser type was a good one, and that works were tooled for putting it into greatly increased production when war came. And for practical purposes one may say that Germany went through the war on five tanks: the light, which appeared in 1939 and 1940, the Mark III and Mark IV cruisers, the Panther and the Tiger. There were variants, but not such as to affect production seriously. There were also experiments with other types, but they did not go to mass production. These five all had high merits. The guns were good too, and the 88-mm, quite an old gun in its antiaircraft role, particularly good.

We made a less favorable start, and analysis of the subject revealed that it was this factor which for so long dogged our progress. It is the background to the White Paper on tank production issued on July 15, containing two reports and the Government's replies to them. As the Prime Minister of the day, Mr. Churchill, remarks in his second reply, dated 2 August, 1944, it was only during 1943, when satisfactory American tanks became available in adequate numbers and British forces ceased (after the Tunisian campaign) to be engaged in large-scale armored operations for the time being, that the fear of a quantitative deficiency passed away. It was only then that we could take a breath and deal with the whole problem of tank production and design in the proper way. The immediate result was that British tank output dropped, as is natural when one takes a breath, but the longer-term result was good. Yet

this factor in itself is not a complete answer to all the charges which have been made, or to the criticisms embodied in the White Paper. It is one thing to prove that you have worked under handicap and another to convince the world that you have done the best you could.

The Select Committee on National Expenditure does not confine itself entirely to tanks. It deals also with antitank guns where they were also produced for use in tanks. Nor does it cover the whole record of tank production. There is, for example, little about the Valentine, a tank of the transition period which possessed a number of good features. One of the criti-



A "Comet," armed with a 77-mm gun, crossing rough ground during a demonstration. (The Illustrated London News.)

cisms of which the Prime Minister freely admitted the justice, was that if the potential value of the 6-pounder gun, both as an antitank gun on field-mounting and as a tank gun, had been appreciated when it was first designed, it could have been put into production twelve months earlier. Mr. Churchill did not, however, accept the criticism of the 17-pounder, to the effect that there had been no definite plan as to how it was to be used. In its second report, the gun with which the Select Committee is concerned is the 75-mm, in the production and mounting of which it alleges undue delays. Here Mr. Churchill

defends the policy and states that the trouble was due to the development of weaknesses which did not appear in the tests. But these weaknesses were due to faulty material.

However, it is to the tanks themselves that the eyes of most readers studying this by no means easy document will probably turn. Here the Select Committee is dealing in the early stages with the Crusader, which General Martel has described as being "the makings" of a good cruiser, but which was never anything more, and throughout with the Cromwell and the Churchill. Most people have now heard of the early disaster of the Churchill and



A "Cromwell" cruiser tank, the forerunner of the "Comet"—less reliable than the Sherman but faster. (The Illustrated London News.)

the reconstruction required to make it efficient. The Cromwell had a rather different story. Delays, rather than rushed production, were its main trouble. There were difficulties about engines, and there seems no doubt that British industry found it harder to produce satisfactory tank engines than the Americans did. And not long after the Cromwell had reached full production it was decided to "tail off" the output—that is, after the middle of 1944—in order to concentrate upon the Comet, which was an adaptation mounting the latest gun, the 77-mm. This was a very fine cruiser tank, which suggested its

good qualities by its looks—and though a good-looking tank may be faulty, just as a well-shaped thoroughbred horse may possess a weak heart, yet appearance is an indication of merit in a tank as in a horse. The Comet's 77-mm gun was also first-class, extremely accurate at long range. I believe its penetrative power was a trifle less than that of the 17-pounder, but it was more effective with high explosive. But it came into production late, and the number in action before the end of hostilities was relatively small.

Meanwhile a certain number of Shermans had been adapted to take the 17-pounder. Our early battles in Northwest Europe were fought with Shermans and Cromwells, the Shermans being the more reliable and the Cromwells the faster. We thus possessed fairly good cruiser tanks, and when the Comet arrived, a few cruisers of the highest class. But there was no advance upon the Churchill as an infantry or close-support tank, though it was equipped with extra frontal armor. It was used with effect in the breaking of the Adolf Hitler Line in Italy, and General Leese reported that the armored brigade equipped with Churchills which supported the Canadian Corps was asked to bear the Canadian Maple Leaf on its tanks. There was no similar report from Normandy, because there the Churchill was confined, except in the case of one brigade. In that case General Montgomery (as he then was) reported that the Panthers and Tigers were not to be feared, because they were mechanically unreliable and the Panther was very vulnerable from the flanks; provided our tactics were good, we could defeat them without difficulty. If so, the tactics must have been faulty, because it is manifest that these tanks were not defeated without a great deal of difficulty.

The Select Committee had in its second report (dated some three months before the invasion, whereas the reply is dated

several weeks after the landing) expressed anxiety about the relative armament of British and German tanks, pointing out that, according to the information available to it, the 17-pounder was the only British gun which in tank *versus* tank fighting could be regarded as in the same class as the German 75-mm in the Panther, or the 88-mm in the Tiger. There it showed foresight and also moderation, since it is to be doubted whether "user" testimony today would agree to put the 17-pounder, excellent gun though it was, in the same class as the 88-mm. But the controversy tends to move into a realm from which I myself should always like to see it excluded: roughly, an argument as to whether the Germans produced good tanks whereas the British produced bad tanks. The real question at issue is whether as Field Marshal Montgomery has stated, a single standard type of tank will suffice or whether, as others believe, there should be two types, one a cruiser for fast and open fighting, and one heavily armored and mounting a big gun for close support of the infantry. This problem was complicated for us because we had to think so much in terms of transportation, and especially of tank-landing craft; but after

the capture of Antwerp, landing-craft were not required, and in every other operation in the whole course of the war we possessed, or quickly acquired, a port. So far as production goes we could have had a "super-Churchill."

If, however, one sets out to find the main source of weakness in the production of British tanks during the war, it will probably be seen in a failure to interrelate successfully the tank and gun. And that, of course, constitutes the chief problem, since a tank is above all an armored gun-carrier. The change from one type of gun to another—nearly always a heavier one and if not, one of higher velocity—generally necessitates drastic alterations in the structure of the tank. These, in turn, create delay. Meanwhile, perhaps, it has been decided that the armor is inadequate, and it may then become a question whether or not it would be wiser to create a new model. But if so there must be something for the troops to use until it is ready, and that something may well clutter up factories wanted for the later development. Extremely good organization is called for and the closest contact between troops, staffs, manufacturers and designers.

Airborne Units in River Crossings

Translated and digested at the Command and Staff College from an article by Captain Villalba in "Revista de Aeronáutica" (Spain) June 1946.

FOR a long time it has been said that rivers are obstacles to combat which cannot be avoided, they must always be faced. This principle has been true in the past, but it is no longer true, since it is now possible to surmount rivers by using the third dimension of terrain.

Rivers constitute an effective and continuous natural defense against armored units. In principle, at least, a river halts the exploitation of a breakthrough and causes a new and hazardous establish-

ment of contact with the enemy, with the resulting alteration of the strategic and tactical situation. It requires concentration of troops and supplies on its banks, establishment of a bridgehead, the building up of forces within that bridgehead, and finally engaging the enemy in battle, possibly after he has had time to reinforce his units in front of the bridgehead, from where he knows our future operations must certainly start.

Airborne units make the establishment

of bridgeheads on the enemy side possible with almost absolute surprise, and often are able to seize bridges that have not been destroyed, thus permitting rapid exploitation of the success achieved, and to defeat the enemy in isolated groups without giving him an opportunity to regroup his forces and thus build up an effective resistance.

The airborne units that cannot rapidly link up with the ground units will be destroyed just as soon as the enemy can concentrate sufficient forces to attack them. Airborne attacks, therefore, should be launched when ground units are still far from the river, but not so far that they cannot reach the airborne units within two days.

The places selected for the airborne landing should meet, as far as possible, the following conditions:

1. Be close to the place where ground units can launch an attack, or near the place where an attack is already in progress.

2. Have a good road net that will help future attacks.

3. Be such that the airborne units can isolate the place where the ground units will attempt to cross the river.

4. Have suitable terrain where it is possible to land gliders.

5. Have terrain where it is possible to construct rapidly a landing strip capable of accommodating large transport planes.

To disregard absolutely some of these conditions is to reduce greatly the possibilities of achieving success.

Time of Attack

The time of attack will always be determined by the time when the ground units will reach the river. As previously stated, the ground units should not take more than two days to reach the airborne units. In general, it will not be possible to select the time of attack with such pre-

cision that the bridgehead has barely been consolidated when the advanced ground units reach it. It is necessary to enumerate one or more possible courses of action which will influence the battle so that it will conform to our previously conceived plans.

Establishment of Small Bridgehead

Large airborne units need vital space on which to land, concentrate, and redeploy. Besides the space, they require a certain amount of security which will be obtained at first by establishing a small bridgehead with the aid of parachute troops.

The action of these troops must be rapid, so as to forestall the enemy from employing powerful forces that will prevent the concentration of the airborne troops.

Parachute troops, launched before daybreak, should have a defensive line established that by early morning covers the routes of approach and protects the area of the landing.

Other airborne troops should land immediately so that by night they will be fully deployed and well-established in the bridgehead. They should expand the bridgehead by every means possible so that it will constitute a base for future operations.

The Landing

The landing is, perhaps, the most dangerous moment. Concentrated in a small area without knowing whether a rapid expansion will be possible, and constituting a renumeration target for all enemy arms and weapons, the airborne units can easily be eliminated. To counteract this, the airborne units should be provided with a sufficient air support to prevent enemy air attacks and to neutralize enemy artillery.

The Build-Up

Grouped into combat teams and with the parachute troops as an advance guard,

the airborne units will try to establish a defensive line around the perimeter of the bridgehead. After reaching this line and occupying it, Command Posts and Observation Posts will be established, supporting weapons emplaced, antitank mines laid, existing obstacles improved, and, in general, the position will be so organized that it can be progressively and rapidly improved.

A communications net should connect the Observation Posts and the outposts, as well as the Command Posts, with the available artillery units. This would allow flexibility of fire power and partially compensate for lack of heavier artillery.

The actual securing of the bridgehead will not be difficult initially, since normally the enemy will not be on the alert, but, on the contrary, the defense of the conquered area will be hazardous, since it will have to withstand strong enemy counterattacks.

A large number of heavy mortars should be used to reinforce the fire of the artillery, and counterattacks should be fully supported with all artillery available. Liberal use of automatic weapons increases the fire power of the relatively light forces and thus compensates somewhat for their lack of numbers.

The lack of artillery and tanks will make the defense against enemy armor difficult and we know that as an antitank gun the 37-mm is ineffective. Therefore, the infantry should be equipped with rockets, and mine fields should be covered with fires so as to prevent the enemy from clearing paths through them. However, the supporting air forces can supply a very effective defense against tank concentrations menacing the bridgehead.

It is necessary, in view of the scarcity of weapons and ammunition, to use the artillery for close-in fire and let air forces act as long range heavy artillery.

Supremacy of the air is absolutely necessary in this kind of operation, but even under these circumstances if contact with the ground units is not established soon, the bridgehead will be progressively reduced and difficult to reinforce, and will finally be overrun by the enemy. The enemy will have an ever increasing amount of artillery, tanks, and even momentary air supremacy at his disposal.

In the recent war, there were many instances of this kind of operation. These must be studied very carefully to determine the correct use of this arm in any future operations.

Destructive Combat or Subversive War?

Digested at the Command and Staff College from an article by Colonel M. C. Perceval-Price in "The Journal of the United Service Institution of India" July 1946.

THE particular methods which brought about the final defeat of Japan and of Germany have made us inclined to concentrate our attention and consideration on methods of causing mass destruction of material, such as the atomic bomb and saturation air raids. Speculation on the future of war has become focused on those

weapons and methods which completed the destruction of our enemies, without consideration of the conditions which made them so effective. It may be wise to consider whether this restricted form of speculation is justified or prudent.

The particular weapon which completed the destruction of the *Scharnhorst* was

a torpedo fired from a cruiser; but in speculating on the future role of battleships in naval warfare we do not confine ourselves to a forecast of bigger and better torpedoes and estimates of the efficiency of defensive measures against them. These things are considered in relation to the weapons and tactics which led up to the opportunity of sending the *Scharnhorst* to the bottom with a torpedo.

If the war had ended after the fall of Crete we would probably have found military thought centering round the development of airborne operations to the exclusion of other forms of fighting; or if it had ended after the fall of Tripoli our speculation would have been mainly concerned with the development of tanks, mines, or self-propelled guns. There is a natural mental perspective which causes events which are close to us to hide the background.

The trend of development towards mass destruction of material has blinded us to other trends, and caused us to overlook other developments. This is partly because such mass destruction took a large part in the final defeat of our enemies, and partly because the effects of it still remain unpleasantly evident even to the victors, who have experienced this destruction in smaller measure. This development of destruction is not confined to the last war, but it has only become evident in the twentieth century. The South African and Franco-Prussian Wars were not noticeably more destructive than the Crimean or Napoleonic Wars. Nor were the campaigns fought in India more destructive than those fought in the time of the Moghuls—rather the reverse.

Previous trends of military development towards the mass employment of particular weapons have occurred, but have been abandoned because of their very tendency to mass employment. In 1913 and 1914 the tendency was to mass as many riflemen in the front line as possible, with

reserves ready to take the place of those who became casualties. It was felt that the more men there were the more rifles there would be, and the more rifles there were the more bullets there would be. Obviously the more bullets there were the fewer enemy would be left alive. Yet this mass of musketeers was soon found to be a vulnerable target without effective hitting power. They were vulnerable because of their concentration, and they were ineffective because, although their weapons were lethal, they were not given the chance that they had expected of aiming them at the enemy.

Again in 1917 the trend of development was towards longer and longer bombardments and heavier and heavier barrages. Yet this mass employment of artillery was found to have drawbacks because of the very efficiency of its powers of mass destruction. True, the emplacements, personnel and morale of the enemy were to a considerable extent destroyed; but so also were the powers of tactical exploitation lessened owing to the state to which the ground was reduced.

Is it not possible that an effort to obtain even greater destruction of material by atomic bombs, rockets and saturation air raids may also prove ineffective for similar reasons?

Every missile, whether it be rocket propelled, remote controlled, airborne or dependent on atomic energy, has to start from somewhere. Research may therefore be directed towards finding a means of exploding or destroying these missiles at or close to the point of departure. The problem is not one of conveying a large weight of dangerous material accurately to the target. It is a question of setting up, within effective range of the enemy's missiles, the necessary vibration to detonate the explosive, or of creating the necessary electrical or atomic conditions to cause the release of the atomic energy in the bomb or shell.

With the radar aids of the future to assist in the location of the enemy's weapons and missiles, and with improvements in remote control by wireless, it should not prove impossible to achieve this. Bearing in mind that a bomb already exists which can be made to follow a moving target, it does not seem a fanciful dream that we should be able to explode at any rate a small proportion of the enemy's missiles at their point of departure.

If this should be achieved, the more powerful the missile the more dangerous will it be to the firer. A premature explosion with a 25-pounder may be unpleasant but a premature explosion with an atomic projectile is a catastrophe. Assuming development on these lines, the firer of destructive missiles finds himself in much the same position as the rifleman of 1914 in that he is both vulnerable and ineffective. The bigger and more destructive his missiles become and the more that he masses them, the more vulnerable does he become. Nor will his missiles be effective, because although they will be destructive and lethal, he will not be given the opportunities that he had hoped for to launch them at his target.

After 1914 the rifleman hid himself in dugouts and pillboxes and dispersed himself to reduce his vulnerability. He pinned his hopes on getting himself into the enemy's positions by surprise or with the aid of weapons such as tanks. It is quite possible that in the future we may find the firers of rockets and those that launch the atomic missiles, trying to disperse themselves or conceal themselves from radar detection, and trying to get within range of the enemy's vital targets by making use of some form of vehicle which will protect the missiles from the vibrations to which they are vulnerable. But what is comparatively easy with a rifleman is by no means easy with a rocket

launching platform or with a jet-propelled plane.

Just as the employment of massed artillery in 1917 destroyed the possibilities of tactical exploitation, so also does the employment of a mass of modern highly destructive missiles destroy the possibilities of strategic and political exploitation. After two very severe lessons the world may possibly realize that the physical and economical condition of a defeated country is of great importance to the victor. It is just as important, in fact, as the condition of the enemy's roads and bridges are to a victorious army after a breakthrough. Unfortunately or fortunately, the economic condition of one country now affects all other countries who normally have dealings with it, and very considerably affects any nation whose demands on it are sufficiently great to warrant a war in order to obtain them.

The further that we learn to look ahead the more will we hesitate to use weapons which cause mass destruction. The tendency will be to try to get less powerful weapons into the enemy's country by some means or other, so as to force a decision without causing the destruction of too great a part of the enemy's economy and physical resources. In spite of this tendency no one will deny that the use of destructive combat, or the threat of its use, may have a very big effect on any future war. If we are unfortunate enough to be unable to avoid another large war it may not, however, be altogether dominated by weapons of mass destruction. From what has been said above, it appears quite possible that by the time the memory of this war has become sufficiently dim to make another major war possible, such weapons may be largely discarded in favor of other methods of warfare.

What other trends of development in warfare are there which can be found by investigation and examination of recent history?

Before investigating trends which may become more pronounced it is advisable to go back to the fundamental reasons for war as opposed to combat. The only reason for going to war is to force another nation to do something which we cannot persuade it to do by any other means. A robber who wants another man's watch, uses force or threats of force, if he estimates that the owner of the watch cannot be made to part with it by persuasion. If the robber is sufficiently ruthless he will not hesitate to kill the owner in order to gain possession of it. But if the only effective force is a grenade which injures both the owner and the robber and completely destroys the watch, then any but the most foolish robber will pause to consider whether he cannot get the watch by some other means.

This roughly represents the state which we have reached today. The robber of tomorrow who will hesitate to use the destructive grenade will seek some other means of evading the owner's defenses and of causing him pain without risking injury to himself or the watch.

If we examine the history of the war and of the world immediately before and after it, a tendency to work in this very way becomes evident. Hitler's technique in dealing with Austria and Danzig was precisely on these lines. He worked from inside the country which was his objective, and caused acute discomfort and internal upheaval, which he hoped would force acceptance of his demands. In the case of Austria, the stomach trouble caused the surrender of the watch which Hitler coveted.

During the war we have seen effective work done by resistance movements inside occupied countries. The Maquis, for instance, were able to do very much more than similar movements have been able to do in the past. One of the chief reasons for this was the application of modern methods of communication to the organi-

zation of this resistance movement. Another reason was the vulnerability of the industrial economy and transport systems of a highly developed country to sabotage.

In less developed countries the resistance movements were also successful, notably in Yugoslavia and Crete. Timing and coordination are required to get the best results and to avoid such tragedies as the premature rising of the Poles in Warsaw. But it is modern wireless which provides the means of achieving this timing and coordination, and it is reasonable to suppose that in the future we may see even better organized and more effective resistance movements.

In these examples we have discovered another trend of military development very different from that which leads to more and more destruction of material. Subversive war is probably the best name for it; and it is important that we should clearly realize that it is war. Because war in the past has consisted mainly of combat, the soldier is inclined to neglect the consideration of other methods of using force to obtain a favorable decision from the enemy.

But how do these two trends, towards destructive combat and towards subversive war, react on one another? Having suggested that we may be confining our thought too much to the methods and effects of destructive combat, we must not fall into a similar error and neglect all consideration of such destruction.

What more effective method of defense against weapons of destructive combat is there than to place plenty of important enemy personnel at the target? There are two ways of doing this, both of which are intimately connected with the tendency that we have noticed of achieving results by subversive activities. The first method is to conduct the struggle in the enemy's own country without removing his forces or government, and without breaking off diplomatic relations with him.

A *coup d'état* followed by the establishment of a new government prepared to meet the demands upon it, is the successful conclusion to be hoped for from this method. The second method is to invite the enemy into one's own country and there defeat him, without removing him, by making conditions so unbearable for him that he is prepared to withdraw on any reasonable terms. In neither case is the enemy given an opportunity to use weapons of mass destruction against the force which is causing him to change his national policy and make concessions.

The first method mentioned in the previous paragraph is no new phenomenon. There have been many cases in history of revolutions and fifth columns which have received valuable assistance from an outside power. The initiative has, however, usually come from the revolutionaries who have sought external aid and have been prepared to buy it by promises of concessions if the revolution should prove successful. There is no reason why the initiative should not come from outside, instead from inside the country. Practically every nation has its discontented elements, and a number of those who have nothing to lose and every hope of gain by an overthrow of the existing government. Nor are there many nations in which the existing regime cannot be brought into disrepute by the help of bribery and corruption. The object of what we may term underhand aggressor must therefore be to fester and increase such discontented elements by the use of money, the press and broadcasting; to weld together and organize them by the provision of means of communication and of trained leaders and administrators; and finally to train and arm them so that a successful *coup d'état* can be accomplished.

This is not a process which can be carried out quickly or without very considerable effort and expense. But if we recognize that this process is war and

that the alternative is a "slugging match" which has terribly destructive punches by each side, it will be realized that the effort and expense required to achieve the result by subversive activities are vastly less than those required by the "slugging match." Although it is true that the process of fostering artificial revolution is a very slow one, at the end of it the aggressor is in a position to extract the desired concessions from a country whose industrial economy and machinery of administration have not been unduly damaged. Moreover some economic penetration will probably have already been achieved by the aggressor. In fact the conditions which are finally desired are probably reached quicker by underhand aggression than by destructive combat.

Another factor to be considered is the existence of the UNO and the possible threat of destructive combat waged by forces under UNO control. The aggressor who wages subversive war avoids this threat. In fact, if he is really skillful he may even gain the support of the UNO. A careful education of world opinion and well directed propaganda may well succeed in representing the revolution which the aggressor has fostered as the "will of the people," and with the help of a certain amount of gold, voting statistics can be made to confirm this. The "rigged" plebiscite is a comparatively easy concession to make to those who render lip service to democracy.

The second method of placing the enemy on his own target, namely inviting him into one's own country, sounds far from a satisfactory method of warfare, or even self-defense. The degree of success achieved by resistance movements in occupied countries has shown the possibilities of this form of warfare even when hastily organized and dependent to a large extent on help from outside. But in the case of a deliberate resort to a resistance movement by a sovereign state

the movement can be thoroughly organized beforehand, hidden stores of explosives, food and weapons can be prepared and equipment for efficient communication can be made ready. The forces to take part can be trained in peacetime without this training being handicapped by the constant danger of discovery by the occupying power.

How effective can such a method of warfare be, even with all the advantages of previous planning and organization? In Ireland in the early twenties these methods forced England to make a treaty which granted most of the demands of Southern Ireland. No doubt there were other factors which helped to bring about the signing of this treaty, but there are always many factors which help to bring about the successful conclusion of a war. The fact remains that from the point of view of the South of Ireland, the outcome of the struggle was reasonably successful and that the method of applying force that they used was internal resistance within their own country.

It is possibly not even essential to have the whole of the population in support of the resistance movement, although of course such support greatly simplifies the task. A minority, by adopting the methods of gangsters, can gain control of local government and with careful preparation beforehand there seems every possibility that a minority could, by the same gangster methods, gain control of the government of a country, especially one which was controlled by foreigners.

Of course, the answer of a ruthless enemy to an internal resistance movement is to take drastic reprisals against the civilian population. A nation that plans the adoption of internal resistance as a form of war must accept this risk. The casualties to the civilian population from this cause are likely to be less than those caused by a war of destructive combat. If these two forms of war are the

only alternatives, there seems to be no reason for discarding subversive warfare in one's own country on account of the risk of reprisals on the civilian population. The failure of the Nazis to stamp out resistance movements by ruthless methods shows that, provided that morale remains high, internal resistance movements cannot be suppressed by such means.

This method of inviting an enemy into one's own country is naturally only a defensive policy, but let us consider the alternatives open to a nation with few resources available for engaging in destructive combat, when threatened by a nation with many such resources. The first possible course is to recognize defeat and to agree to the demands of the better armed nation. This course does at least preserve the weaker nation intact and its industrial economy and machinery of administration is not destroyed. The weaker nation only survives, however, as a slave, and the aggressor would, no doubt, take steps to see that it remains so.

The second course is to engage in destructive combat with the stronger nation. At best, the stronger nation may decide, after a period, that it does not pay to continue the combat. Even so, the weaker nation will emerge with its industrial economy severely injured, with heavy loss of life to civilians as well as to its armed forces, and with its standard of life lowered. At worst, it may find itself in addition a slave nation, or even be dismembered and find that it no longer exists as a nation at all.

The third course is to put its trust in the UNO and in forces controlled by the UNO. This we may hope will be an effective course. It is quite possible, however, that before the necessary conferences can be held and the forces of the UNO can make themselves effective, the weaker nation may find itself engaged in combat with the aggressor. Even if the

final outcome of such combat is unfavorable to the aggressor, due to the intervention of the UNO forces, the weaker nation will still finish with its economy impaired, a considerable toll of casualties, and a lower standard of life.

The fourth course is that which we have suggested as a possibility, namely an effort to defeat the aggressor by a previously organized resistance movement. This may, of course, be combined with efforts to arrange intervention by the UNO.

There are evidently definite advantages in this method of subversive warfare. To be really effective it requires loyal

support from the bulk of the nation, and the morale of the nation must be high and capable of standing up to reprisals on the civilian population. But all measures of national defense ultimately depend on the morale of the nation and on its determination to preserve its national rights at all costs. Preparation for defense by internal resistance would include measures of education designed to raise the morale of the nation and to prepare it for an ordeal. Recent dictators have made similar preparations very effectively, even though their objects may have been very different to the defense of the nation's legitimate rights.

Russian Tanks vs German Tanks

Translated and digested at the Command and Staff College from a Russian article by Major General I. Iakubovsky in "Krasnaia Zvezda" (U.S.S.R.) 23 August 1946.

ENGAGEMENTS between Russian and German tanks occurred very often during the war just concluded. The situation under which these engagements originated were different, as was the course of the engagements themselves. However, the numerous cases of tank encounters have several common features which uncover the important principles of tank-versus-tank engagements.

The tank units which I commanded fought the Germans in all types of combat—in defense, attack, and in meeting engagements. Sometimes we had to prepare for such encounters, but very frequently these occurred unexpectedly. First a few words about defensive engagements.

As is known, tanks should not be used in the first echelon when on the defensive. The enemy will detect them quickly, take the necessary measures (unless he changes the direction of his attack), or try to find another sector which is not as well defended. By their very nature tanks in defense are used for maneuver, counter-attack, and for major counteroffensives.

However, the situation often compelled us to employ our tanks in the first echelon, and in some cases for the defense of separate sectors.

In the battle for Kiev, after the city had been taken by our troops, the Germans launched a counteroffensive. Their blow was aimed at Fostov, which had been prepared by us for the defense within a very short time. Here our tanks were employed in the first echelon. Since the German attack had been expected from the south, the tank formation was turned in that direction. There was a railroad fill nearby. Part of the tanks were dug-in in the fill, and every tank was given a sector of fire with previously measured distances to the line where hostile vehicles were likely to appear. Some of the tanks were disposed on the height which was the most important objective of the enemy's attack. About one-fifth were in reserve.

We occupied Fostov on 7 November, but on 9 November the German 25th Tank Division began attacking our positions. Seventy tanks attacked us during the

first day. They moved slowly and indecisively. That was, we believed, because the Germans had not reconnoitered our area well enough. Our tanks, occupying better positions for a tank engagement, fired at the enemy point blank. On 10 November, the enemy repeated his attack, this time from the southeast, having gone around our position. But here we used our reserve. Having anticipated the possibility of envelopment tactics on the part of the Germans, special positions for the reserve had been prepared previously. Again the enemy got into the fire of our tanks, and his attack was disrupted. These tank battles continued for four days, and by this time the strength of the German division slowly gave out. In spite of the fact that the Germans enjoyed in this sector considerable numerical superiority, their counteroffensive failed.

Tank engagements also took place under circumstances in which one side had its tanks deployed while the other had had no time to do so, with both sides meeting unexpectedly, or when both sides met each other unexpectedly, both fully deployed. It happened, not infrequently, that both were moving at the time in different combat directions. In order to win such an engagement, one side had to out-maneuver the other. It was important to take into account the character of the terrain, not because one wanted to occupy the more advantageous position, but, rather, to make the enemy fight under disadvantageous conditions.

On 22 November 1942, near Stalingrad, an interesting episode took place. One of my battalions, which was in support of an advancing infantry unit, encountered a group of counterattacking German tanks. The battalion formed a part of the infantry combat formation which was moving in the direction of two small heights situated side by side. The German tanks appeared first from the left, that is, they were moving at about 30° in relation

to the axis of our movement. Thus, although both sides were deployed, the Germans had a better position, at first. The situation could be saved only by a quick and correct maneuver of our tanks to enable us to open fire under more favorable conditions, naturally with the support of the artillery which accompanied the infantry. The distance between the two sides was such that there still was a little time left for maneuver. The right flank company took to the right, went ahead, and occupied a position on the height facing the other company, which was the objective of the German tanks. The rest of the tanks remained generally in the same area, but quickly found better positions. To do so, part of the tanks executed a short maneuver within the battle formation of their unit. Some of the tanks moved back a little. The Germans found themselves just about in the center of the corner formed by the two companies. As soon as they climbed the height, our tanks and artillery opened fire. By the end of the engagement the enemy turned back, and our infantry continued its advance.

In this episode, we should note the maneuver undertaken for the purpose of squeezing the enemy from two sides. The pulling back of some of our tanks in order to occupy better positions should also be noted. In cases of this kind this may be extremely necessary, provided the tanks do not withdraw beyond the effective range of their guns. The distance involved will vary depending upon thickness of armor, the caliber of weapons and other factors.

Anticipating the enemy maneuver is of special significance when one can anticipate the enemy in the opening of fire. The chances for success are with the side that first opens fire. Usually, the advantage of a correct maneuver lies in the fact that this maneuver enables part of the forces to open fire before the enemy does so and to open fire from favorable positions. To



A German Mark III.

achieve this, the commander may have to use his reserve, especially when the meeting takes place with both sides deployed. The situation may call for turning the entire formation or for a regrouping, which under certain circumstances is very difficult to carry out. It is here that the reserves are used.

During the battles for Zhitomir, the tanks of our brigade were in support of an infantry unit. The tanks were not supposed to leave the infantry, but in this case, after a successful engagement, we were assigned the mission of leaving the infantry and taking possession of an inhabited place. Before us were: first a height, beyond it a brook with swampy banks, then another height and, finally, the inhabited place. A swampy grove

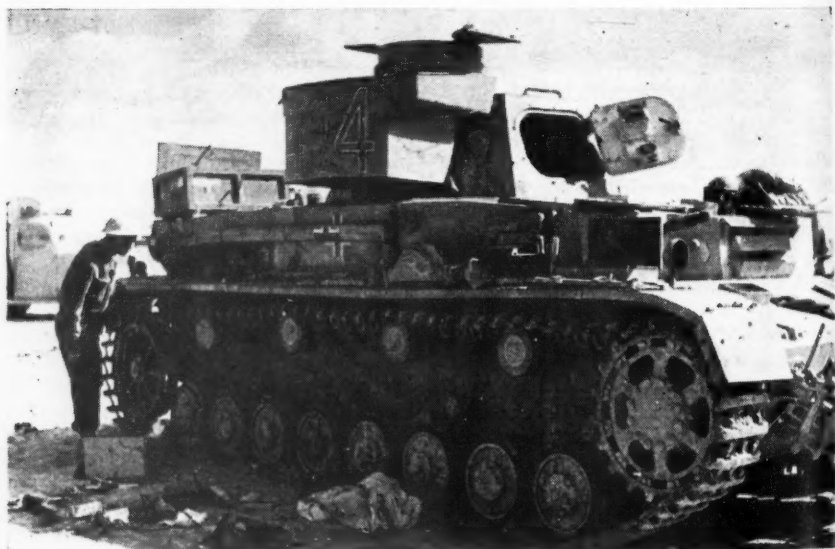
was to the right of us. Unexpectedly, German tanks appeared from the direction of the inhabited place. They were deployed in line. The battle formation of the brigade was still the same, that is, a line formation. The Germans were moving directly toward us, but the distance between the two sides was greater than the range of our guns. Had the two sides continued to move in the same direction, we would have had a frontal encounter. This form of combat is not advantageous, especially for the side supporting its infantry. Attack under the circumstances is really a through attack, that is, each side pierces the battle formation of the adversary. That meant, in this particular case, that part of the German tanks would have gone toward our infantry.

There were other reasons to be considered in this battle. We always sought decision in flanking maneuvers. The best thing to do would have been to rush toward the grove, which would have enabled us to conceal our tanks and open a flanking fire at the same time, but the grove, as it was explained above, was swampy. There remained only one maneuver which was to be executed on the left flank in the form of an envelopment of the two heights mentioned above. It was advantageous for another reason, which was this. With the appearance of our tanks to the left of the second height, the Germans would have found themselves pressed to the swampy grove and the brook.

The regrouping of the brigade would have required more time than the situation allowed, and it is difficult to say what the outcome of the battle would have

been if it had not been for the reserve. It was immediately moved forward. Our tanks found their way to the flank of the German tanks, which at the time were beginning to approach the brook. It was here that the battle took place, the battle in which the Germans lost.

In the above examples all maneuvers were simple, but at times the situation calls for more complicated maneuvers which in a fast moving tank action involve a considerable risk. The tank commander must possess a trained eye in order to estimate quickly the time element, the relation of this time element to the terrain and the distances involved without which not only a complicated maneuver, but even a most primitive one would fail. We do not mention other factors of the situation, the correct use of which enables one, as they say, "to win the flank and in the end to win the battle."



A German Mark IV.

Sometimes, no maneuver of any kind is possible for one or the other side. The side that fires first wins. Such fights happened in hostile deep areas when the situation was fluid, and when our tanks suddenly found themselves face to face with hostile reserves. It was in a situation of this type that our brigade met a unit of the German 17th Tank Division. The meeting took place at night. Our tanks were stretched out along the road, half of the column had crossed the intersection of two roads when suddenly we noticed two German tanks crossing the road. It was the beginning of a tank column barely visible in the darkness. An order was issued by radio to open fire, concentrating it on the road used by the German tanks. All the turrets were instantly turned and there began a shelling of the hostile column. The German tank crews left their tanks and fled. By opening fire first our tanks won the engagement.

This case typifies encounters between tank columns which took place in many offensive operations by day and by night. It emphasizes the importance of reconnaissance and combat security. It emphasizes the importance of continuous observation. Knowing your mission and the

mission of your neighbor, knowing the types of hostile tanks, the men should attentively observe the battlefield and everything else—all that meets the eye. This is extremely important for flank security.

All stops in a tank battle should be short. Generally speaking, every delay may mean death—in maneuver, in attack, and in firing. All movements must be carried out with the maximum speed. When in possession of numerical superiority, one can risk a frontal attack, provided it is executed at high speed. It is important, by the way, to utilize skillfully one's numerical superiority. It happens sometimes that only a small part of the available forces is committed, while a timely employment of all the forces would really be more advantageous.

Use more of the available forces (knowing of course the relative strength of the sides), maneuver fast, and open fire first. Always force on the enemy a tempo that is too fast for him, but go through with it yourself. These are, in my sincere opinion, the most important rules to follow in a tank battle. They start unexpectedly and end quickly, and the battle is won by the side that is the quicker, more flexible, and possessing a better mastery of maneuver and fire.

The Decisive Episodes of the Allied Air Offensive Against Fortress Europe

Translated and digested at the Command and Staff College from a French article by Rear Admiral Pierre Barjot in "Revue de Défense Nationale" (France) June 1946.

DURING the five-year period from May 1940 to May 1945, a total of 2,700,000 tons of bombs were dropped on Germany and German-occupied territories. Up to January 1943, the tonnage dropped represented scarcely five per cent of this total, however. It was, therefore, in the period subsequent to January 1943 that ninety per

cent of the total tonnage was dropped on Germany. Also, it was from 1943 on that Allied aviation was able to make use of airdromes in North Africa in addition to those in Great Britain. Hence, the strategic bombardment over Europe may be divided into two periods.

The choice of Casablanca in French

Africa as a locale for the fixing of the plans for the strategic air offensive was significant and showed the importance of the African base in the strategy which led to the collapse of the Reich.

As early as July 1943 the airdromes of Algeria and Tunisia served as bases for the bombers of the 9th Air Force which had come from Egypt and Libya. Then, in October of 1943, new bomber formations were based in Italy, in the neighborhood of Foggia whose airdromes served as a springboard for the 15th Air Force which had been made up for the special purpose of cooperating with the 8th Air Force in the bombing of Germany. There resulted from this situation an offensive of the pincers type centered on one hand in the airdromes of Mildenhall (England) and, on the other hand, in Foggia, Italy, which permitted a simultaneous pounding of the objectives of north Germany, Bavaria, Austria and Silesia. It was not until the beginning of the summer of 1943 that the long range attacks began, conducted at first with inadequate fighter escort, but later in 1944 they were provided with an escort of fighters from beginning to end. This intensified aerial offensive of 1943-44 which constituted the second period, comprised two principal phases:

1. The attack on aircraft factories and fighter aviation (July 1943 to April 1944).
2. The attack on fuel supplies (May to November 1944).

Finally, there was a third period following the liberation of France, in which the French and Belgian airdromes were utilized.

The history of the offensive against "Fortress Europe" is that of the penetration of Allied aviation into the skies of the Reich. In 1940, because of the impossibility of effecting a penetration during daylight hours, the RAF had fallen back onto night bombings. It was not until the summer of 1942, with the advent of the B-17 Flying Fortresses of the 8th

American Air Force, that a return was made to daylight operations. This was made possible by the powerful armament carried by the B-17's.

It is interesting to note that the RAF attempted at first to hit difficult targets at night, such as aluminum works or airplane motor plants. At this time, railway yards were considered as secondary objectives and it was only exceptionally—and not before May and June 1941—that the RAF attacked one of the principal railway yards of the Ruhr, that of Nam. The arrival of Marshal Harris at the head of the Bomber Command brought about "zone bombing," that is to say, the bombing of a definite area which has come to be regarded as a systematic method of aerial attack. The idea of Marshal Harris was that the war industries of the Reich could not be disturbed by quantities of bombs as small as those being dropped at that time (1,000 to 5,000 tons per month) and that it was preferable to strive for demoralizing effects by the destruction of cities. As is known, the bombing of these centers of population began on 30 May 1942 by a raid of a thousand bombers on Cologne, followed by analogous raids on Essen in June and on Hamburg in August. But this offensive against German cities did not give the anticipated results.

In October 1942 the U-boat bases and their construction yards were selected as bombing objectives. Although from October 1942 to June 1943, 3,400 tons of bombs were dropped onto bases along the Bay of Biscay, Lorient, Saint Nazaire, La Pallice and Bordeaux, and onto the construction yards of northern Germany the results were not appreciable. The detection of submarines on the seas and their attack by means of planes, proved to be more effective than the attack on their construction yards. Thus, it was the carrier based aviation and not the heavy bombers that eliminated the threat of the U-boat.

In the meantime, the successful landing

of 8 November 1942 provided the Allies with another springboard: North Africa. There followed an allied conference at Casablanca in January 1943 relative to the plans for the continuation of the war. The famous directive of 21 January by the Combined Chiefs of Staff designated five categories of main objectives in the following order of priority:

1. German submarine construction yards.
2. The German air industry.
3. Railway and highway transportation.
4. Motor fuel industry.

The remaining industrial objectives which were engaged in war production were in priority No. 5.

It should be mentioned that a year earlier, that is to say in February 1942, Hitler placed Dr. Albert Speer at the head of his war industries. Thus the directive of 21 January 1943 opened a virtual duel between American bombing and German war production.

In conformity with the directive, General Eaker, then commander of the 8th Air Force, established his plan of offensive action which was approved by the Combined Chiefs of Staff on 18 May 1943, ten days after the victory of Tunisia, and which modified the priorities and shifted first priority from the submarine construction yards to the aircraft factories.

This change resulted from the fact that under the direction of the Minister of Armament, Albert Speer, a vast plan aiming at the augmentation of the Luftwaffe had been inaugurated, which tended to raise the production of fighter aircraft from 360 per month in 1942 to 1,250 in 1943, and 5,000 in 1944. If, therefore, preventive measures were not taken immediately the number of fighter aircraft would soon become so great as to prevent daylight raids by the B-17's. It became clear that a fierce conflict was about to open between German fighter aviation and American aviation and that it was to

center around the aircraft factories of the Reich.

The Allied offensive against the fighter aviation of the Luftwaffe got under way slowly. Between July and December, 1943, there were but fourteen attacks by the 8th Air Force against these factories, and three on the part of the 15th Air Force.

Losses were very heavy and experience showed that daylight raids without a fighter escort should be discontinued. It emphasized the necessity for the systematic destruction of the German fighter aircraft in the factories where they were produced. It was necessary, if that were to be done, to increase the fighter escort. In August 1943, the P-47 Thunderbolts tried out a supplementary fuel tank but this expedient permitted them to escort the bombers a distance of about 500 kilometers at the most. In November 1943, the P-38 Lightnings added two fuel tanks, but this was still not enough to permit them a very deep penetration of the German skies.

Finally, in December 1943, appeared the P-51 Mustangs, single-motored planes equipped with two supplementary tanks which made it possible for them to escort the B-17's over the entire distance. With these new, long range fighters, the general attack against the aviation industry of the Reich was prepared for January 1944, but this offensive had to be postponed until 20 February on account of bad weather.

It was finally on Sunday, 20 February 1944, that operation "Argument" was unleashed, opening the total air battle. On 22 February, the bombers of the 15th Air Force, taking off from Foggia, joined the attack of the 8th Air Force which had started from Mildenhall, in a double, coordinated attack.

In less than a single week, from 20 to 25 February, more than 4,000 tons of bombs were dropped on the Brunswick factories which represented eighty per cent

of the aeronautical production of the Reich. The operation cost 244 heavy bombers and thirty-three fighters, but 692 German fighters were brought down. The offensive against Germany's aircraft factories continued clear into April 1944. It ended with the defeat of the Luftwaffe.

On 5 March 1944 a new examination of priorities given to the objectives of the Strategic Air Forces gave priority to the motor fuel industry—natural and synthetic. Because of the necessity of an attack on the Belgian and French railway yards in view of the coming landings of 6 June, the attack on the motor fuel industry was left in the hands of the 15th Air Force based at Foggia which carried out the attack on Ploesti and on the fuel traffic on the Danube. This was credited with the elimination of forty per cent of the German motor fuel.

Immediately after the Normandy landing, a directive from the Combined Chiefs of Staff stated that the strategic objective for the air formations was now to deprive the enemy's armies of their sources of motor fuel. Ploesti fell on 1 August and the attacks were concentrated on Leuna. A total of 16,000 tons of bombs were dropped on synthetic gasoline plants, benzol refineries and plants, and 23,500 tons on petroleum stores and stocks. There

resulted a drop in the production of synthetic gasoline of ninety per cent and of twenty per cent in the manufacture of explosives.

The systematic employment of strategic bombers against railway networks was not begun until six weeks before the Normandy landing. The aim may be summarized as follows: "to destroy bridges," and "break up rolling stock." This strategy proved effective and resulted in a drop of fifty per cent in railway transportation.

After the Provence landing, the attack on communication routes was given second place in target priorities, immediately after petroleum. Finally, in November 1944, there was a strategic plan which aimed at the paralysis of the entire German railway network east of the Rhine. This plan was interrupted by Von Rundsted's counteroffensive of December 1944 in the Ardennes.

In February 1945 the attack on communication routes was resumed. Its peak was reached in operation "Clairon" of 22 February 1945: a mass of 9,000 planes set out for an attack on the German railway network as a whole. In March 1945, the attack on the railways was concentrated on the points of entrance into the Ruhr, and ended in a veritable aerial blockade of this industrial basin.

Give Us Airships

Digested at the Command and Staff College from an article by Lord Ventry in "The Navy" (Great Britain) September 1946.

IN the war that has just concluded the U.S. Navy used nearly 200 non-rigid airships. They made over 55,000 operational flights, flew some 559,000 hours and escorted over 80,000 sea-going ships. All the ships they escorted were brought safely to port, and only one airship was sunk by enemy action, the K 74, on 18 July 1943, one life being lost.

These airships were employed mainly on antimine and submarine operations, and the presence of an airship with a convoy was a virtual guarantee against U-boat attack. If a submarine skipper was stalking a convoy and spotted an airship, down he went, cursing his luck.

The British Navy, which had pioneered the anti-submarine airship away back in

1915 with the SS 1, saw something of these American K ships in the Mediterranean, for a squadron was sent to Port Lyautey, French Morocco in May 1944.

When they first arrived they were often within sixty miles of the battlefront, and patrolled the straits of Gibraltar by night. As the battle receded the airships moved into the Mediterranean proper and after living on mooring masts for ten months were at length able to use the airship shed at Le Quers near Toulon.

After their arrival no U-boats are believed to have entered the Straits. The airships were therefore mainly employed in assisting the mine-sweepers, a job which they did to perfection. They worked largely with the 19th Mine-sweeping Flotilla, often carrying British naval officers as observers. Sometimes the airship would fly ahead of the flotilla, warning the latter by radio. At other times the airship would patrol the unswept areas, and in the clear waters of the Mediterranean the mines were often easily seen even if fathoms down.

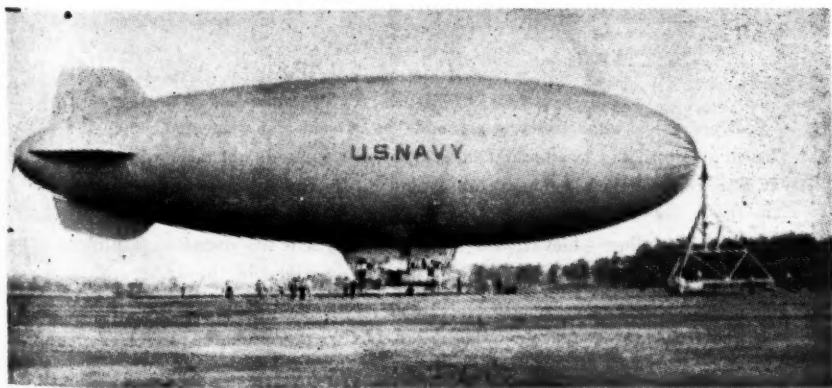
The airship gave the exact position of a mine, which the airplanes could seldom

do, and the sweepers were warned when a mine bubbled up to the surface. Thus did history repeat itself, for it was a British naval officer, the then Lieutenant Kerrison Kiddle, R.N., who first attempted to look for mines from the air. This was from an army 10,000 cubic foot captive balloon based on Gibraltar in 1905. Eleven out of twelve mines were found, and as a result their color was changed.

The airship, therefore, proved itself as an invaluable aid to the mine-sweepers, and the Navy was sorry when the last one was deflated. The CO, his officers and men of Squadron 14, U.S. Navy completed a fine job of work.

The airships' most important job, however was to guard shipping. The Eastern seaboard of the North American continent was covered by airship patrols from Canada to Brazil, and the airships also operated in the same manner up and down the Pacific coast. In the beginning there were few airships and the U-boats ventured in close to shore, for there were plenty of targets when the convoys were gathering and dispersing.

As the numbers of airships increased



K-class airship, used by the United States for operational duties, at her mooring mast.

the U-boats became more cautious, sinkings were fewer, and every airship escorted convoy got through in safety.

With the arrival of the Schnorkel submarine the airship's importance increased, for these U-boats were almost impossible to spot from fast moving airplanes. If the war had not stopped so suddenly we would have had U.S. airships working from our own shores. Unfortunately, however, our old airship stations at Mullion, Pembroke, Anglesey and Luce Bay had long disappeared. So the airships—which all along could have been invaluable in guarding the western approaches—would have worked from mooring masts.

Airships have now been employed on these duties in two major wars, and with complete success. Out of the many thousand surface ships escorted only two were sunk. This was in 1917, when a convoy escorted by a Coastal airship from Mullion lost two ships after leaving Falmouth. This exception proved the rule, and the success of that U-boat has never been repeated.

The British naval airships, of which there were 103 in November 1918, flew 2,450,000 miles in over 88,000 flying hours. It was the success of these airships of the R.N.A.S. which induced the French, Italians and the Americans to do likewise.

Unfortunately, the Navy lost their airships in 1919, and since then have been without this useful weapon.

The modern 426,000 cubic feet K-class non-rigid airship has a speed range from zero to over seventy knots and can fly for over fifty hours at cruising speed. It can operate in the thickest of fogs without the aid of outside electric equipment, and, thanks to the British invented mooring mast, is virtually an all-weather craft.

It is the ideal platform for radar and such like, and given air cover is capable of fine service, and now improved models are on the drawing boards.

The U.S. Navy today employs airships as normal fleet units and finds them invaluable. Perhaps one day the British Naval Air Arm will also have its airships.

Hierarchical superiority is stronger, more real and respected, when it is based on moral and intellectual superiority. Discipline is not mere convention: it is a condition of the heart and mind; it is the spontaneous acceptance of the rules and norms of good conduct, with a definite end in view. Military discipline is hierarchical subordination; it is the complete fulfillment of duty; it is the spirit of renunciation and sacrifice in the service of the nation.

Lieutenant Colonel Correia Lima in "Nação Armada" (Brazil)